

Nos. 2023-2171, 2023-2172

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**UNITED STATES COURT OF APPEALS  
FOR THE FEDERAL CIRCUIT**

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**UNITED SERVICES AUTOMOBILE ASSOCIATION,**

*Appellant,*

**v.**

**PNC BANK N.A.,**

*Cross-Appellant.*

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On Appeal from a Decision of the United States Patent and Trademark Office,  
Patent Trial and Appeal Board in No. IPR2022-00076

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**APPELLANT UNITED SERVICES AUTOMOBILE ASSOCIATION'S  
OPENING BRIEF**

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December 29, 2023

## PATENT CLAIMS AT ISSUE

### **U.S. Patent No. 10,769,598:**

**1.** A method of facilitating remotely depositing funds into a user's account with a bank's computing system and without using an Automatic Teller Machine (ATM), comprising:

providing a remote deposit application for download to a customer device, wherein the remote deposit application comprises computer-executable instructions that, when executed by a processor, provide a user-interface and control a camera associated with the customer device to facilitate capturing at least one electronic image of a check;

receiving at the bank's computing system, via the user-interface on the customer device: authentication data, an electronic identification of an account for receipt of a value associated with the check, an electronic indication of the value associated with the check, and the at least one electronic image of the check;

determining whether the check was previously deposited using the at least one electronic image of the check; and

initiating and/or logging a first deposit of the value to the account via the bank's computing system unless the bank's computing system determines from the at least one electronic image of the check that the check was previously deposited.

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**10.** A method of facilitating remotely depositing funds into a user's account via Internet-based communication without using an Automatic Teller Machine (ATM), comprising:

coordinating with a remote deposit application on a customer-controlled device to facilitate a deposit procedure including capturing, via a camera associated with the customer-controlled device, at least one electronic image of a check;

validating authentication data provided via the customer-controlled device;

receiving into a bank's computing system, via the customer-controlled device and the Internet-based communication:

an electronic identification of an account for receipt of a value associated with the check and an electronic indication of the value associated with the check, and the at least one electronic image of the check;

determining whether the check was previously deposited using the at least one electronic image of the check; and

after validating the authentication data, triggering a deposit of the value to the account via the bank's computing system unless the bank's computing system determines from the at least one electronic image of the check that the check was previously deposited.

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**15.** A system for facilitating remote deposit of funds into a user's account via Internet-based communication without using an Automatic Teller Machine (ATM), comprising:

one or more processors;

communication circuitry configured to receive data from a user-owned device, wherein the data comprises electronic image data for a check; and

one or more tangible, non-transitory machine-readable media comprising processor-executable instructions, that when executed by the one or more processors cause the one or more processors to:

authenticate interaction with the user-owned device based on authentication data received from the user-owned device via the communication circuitry;

accept or determine amount data indicative of an amount of the check from the user-owned device via the communication circuitry;

accept or determine account data identifying an account for receipt of the amount of the check from the user-owned device via the communication circuitry;

accept at least one electronic image of the check from the user-owned device via the communication circuitry;

determine whether the check was previously deposited using the at least one electronic image of the check; and

activate updating of the account to reflect a deposit of the amount into the account unless the bank's computing system determines from the at least one electronic image of the check that the check was previously deposited.

## CERTIFICATE OF INTEREST

Counsel for Appellant certifies the following:

**1. The full name of every party represented by me is:**

United Services Automobile Association

**2. The name of the real party in interest (if the party named in the caption is not the real party in interest) represented by me is:**

None.

**3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the party represented by me are:**

None.

**4. The names of all law firms and the partners or associates that appeared for the party now represented by me in the trial court or are expected to appear in this court (and who have not or will not enter an appearance in this case) are:**

IRELL & MANELLA LLP: Michael Fleming

**5. Related cases:**

*United Services Automobile Association v. PNC Bank*, Fed. Cir. Case No. 2023-1639 (originating U.S. District Court for the Eastern District of Texas)

**6. Any information required under Fed. R. App. P. 26.1(b) (organizational victims in criminal cases) and 26.1(c) (bankruptcy case debtors and trustees):**

None.

December 29, 2023

/s/ Anthony Rowles

Anthony Rowles

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\*\*\* All emphasis is USAA's unless otherwise noted \*\*\*

**GLOSSARY**

'598 patent	U.S. Patent No. 10,769,598
Board or PTAB	Patent Trial and Appeal Board
Byrne	US 2006/0249567 A1 by Byrne, et al. (“Ex. 1004”)
Garcia	WO 2005/043857 A1 by Garcia-Verdugo, et al. (“Ex. 1003”)
IPR	<i>inter partes</i> review
PNC	Petitioner-Appellee PNC Bank, N.A.
POR	Patent Owner Response
POSA	person of ordinary skill in the art at the time of invention
Singfield	US 2005/0097046 A1 by Singfield (“Ex. 1005”)
USAA	Patent Owner-Appellant United Services Automobile Association

## **STATEMENT OF RELATED CASES**

*United Services Automobile Association v. PNC Bank*, Fed. Cir. Case No. 2023-1639 (originating U.S. District Court for the Eastern District of Texas). The 23-1639 appeal is from a district court case that also involved the '598 Patent, however, there is no overlap between the issue in this appeal (alleged obviousness) and the issues in the 23-1639 appeal (section 101 and damages) and this Court previously declined to companion the cases.

## INTRODUCTION

United Services Automobile Association (USAA) is a member-owned association dedicated to serving members of the U.S. military and their families. Because USAA's members are stationed around the world and far from physical bank branches, it was historically difficult for them to deposit paper checks. To help its members deposit checks more easily, USAA invested substantial resources in developing technology that would allow its members to deposit checks using mobile devices they already owned. The '598 patent, which traces its priority to 2006, is one of several patents to emerge from USAA's groundbreaking work enabling mobile remote deposits. The claims at issue—methods whereby images of a check captured by a camera-enabled customer device, such as a mobile phone, are received, analyzed, and verified as valid checks that have not been previously deposited—permit bank customers to deposit checks with mobile phones rather than with specialized, expensive prior-art check-processing machines that are not practical for ordinary consumers.

PNC Bank, N.A. (PNC) filed an IPR petition seeking to invalidate every claim in the '598 patent. The Board instituted review and invalidated claims 1 and 8-20 as obvious, but confirmed the validity of dependent claims 2-7. This Court should reverse the Board's decision on claims 1 and 8-20.

PNC's obviousness theories are based on a combination of three references: Garcia, Byrne, and Singfield. Its primary reference, Garcia, teaches the use of a camera-enabled cellular phone to capture images of a check and transmit them, along with various user-entered data, to a bank. It lacks, by PNC's own admission, numerous elements of the asserted claims including those directed to providing a "remote deposit application for download" to control the camera, and those directed to validating, based on the submitted check image, that the check depicted has not been previously deposited. PNC thus turns to Byrne, which teaches a method of distributing software to desktop computers to control external, third-party specialized check scanners, and to Singfield, which teaches a method of duplicate check detection using data obtained from a specialized scanner equipped with a magnetic ink reader.

Byrne and Singfield (on the one hand) and Garcia (on the other) presented two different, early approaches to remote check deposit. Byrne and Singfield use specialized check-scanners to extract and use high quality data from checks. Garcia takes lower quality images captured by the camera on a cellular phone, and is correspondingly dependent on user-entered data.

PNC's obviousness challenge depends on the theory that a person of ordinary skill in the art ("POSA") would have been motivated to combine these three references. According to PNC, a POSA would treat all elements missing from Garcia

as “implementation details” and simply import them from Byrne and Singfield. *See* Appx259 (“Although certain implementation details recited in the challenged claims are not expressly described in Garcia, these details would have been obvious in view of analogous art, including Byrne and Singfield.”).

PNC’s obviousness theory is not supported by evidence. To the contrary, it was rejected by PNC’s own experts in a related district court proceeding, who specifically *disagreed* that “in 2006 it would have been obvious that a person of skill could create a system that used consumer digital cameras to successfully deposit checks.” Appx5664(124:20-25). PNC’s experts further testified that “[a] workable system to deposit check images captured by mobile devices required developing algorithms that were not inventable in the prior art or known to those of ordinary skill in October of 2006,” Appx5582(42:6-19), and that persons of ordinary skill believed “[t]he quality of mobile phones in 2006 was not sufficient.” Appx6041(938:10-15), Appx6044(941:13-25), Appx6046(943:4-7).

With respect to PNC’s theory for combining Garcia and Singfield, PNC argued that a POSA would have been motivated to use the images captured by Garcia’s cameraphone to extract data, such as an individual’s signature, and compare that data to previously deposited checks in a database to identify duplicates. But PNC introduced no evidence showing that a POSA would have found that approach viable using images from a cameraphone, and its own experts testified to the contrary

as discussed above. The Board’s finding to the contrary was not supported by any substantial evidence and simply ignored the undisputed facts conceded by PNC.

PNC’s theory for combining Garcia and Byrne was similarly flawed. The petition asserted that a POSA would have been motivated to implement Byrne’s “thin client” application into Garcia’s system to realize certain benefits—ease of maintenance, storage requirements, bandwidth usage, security. However, the undisputed evidence was that for each of these supposed motivating “benefits,” the asserted combination would have been *worse* than the status quo of Garcia.

The Board’s decision to invalidate claims based on PNC’s faulty asserted combinations was not supported by substantial evidence and should be reversed. In addition to its substantive error, the Board’s analysis was laden with procedural errors, and its conclusory examination of the evidence on issues that it incorrectly rejected as “forfeited” in the Patent Owner Response independently justifies vacatur.

### **JURISDICTIONAL STATEMENT**

The Board entered its final written decision on May 10, 2023. USAA filed a timely notice of appeal on July 12, 2023. This Court has jurisdiction under 28 U.S.C. § 1295(a)(4)(A) and 35 U.S.C. § 141(c).

### **STATEMENT OF THE ISSUES**

1. Whether the Board’s finding that a skilled artisan would have been motivated to combine references Garcia, Byrne, and Singfield with a



reasonable expectation of success lacked substantial evidence when the record lacked evidence that any of the benefits allegedly motivating a POSA would have been realized by the asserted combination or that a POSA would have expected Singfield's duplicate detection technique to work with Garcia's cameraphone-based system.

2. Whether the Board abused its discretion in finding USAA's sur-reply arguments forfeited when they were introduced in the Patent Owner Response and developed further in sur-reply to respond to new arguments, evidence, and expert testimony presented in PNC's Petitioner Reply brief.

### **STATEMENT OF THE CASE**

#### **I. USAA develops groundbreaking technology to allow military families dispersed around the globe to remotely deposit checks, and claims one aspect of that technology in the '598 patent.**

USAA serves members who are deployed all over the world, and therefore does not operate a traditional network of bank branches and ATMs. Because of that, USAA invested heavily in its mobile banking infrastructure, including mobile remote check deposits. In 2009, USAA gave its members the ability to deposit checks entirely using their mobile phone, becoming the first bank to do so, building upon its 2006 service allowing depositing a check from home using a consumer scanner. *See* Appx4536-4538. As recognized by the industry at the time, while

“USAA may seem like an unlikely innovator in mobile banking . . . with just one branch, in San Antonio, and [military] customers deployed all over the world, the company has been aggressively developing an anytime, anywhere banking strategy.” Appx4537.

The '598 patent is one of the patents USAA obtained to protect its groundbreaking research. Most relevant here, the claims are directed to a “providing a remote deposit application for download to a customer device” that “provide[s] a user-interface and control[s] a camera associated with the customer device to facilitate capturing at least one electronic image of the check” and delivers the captured electronic image to the bank’s computing system, and the image captured by the customer device is then itself used to “determin[e] whether the check was previously deposited using the at least one electronic image of the check.” *E.g.*, Appx151(15:39-62).<sup>1</sup>

As explained in the specification, “[a] particular advantage of . . . the invention is its ability to operate in conjunction with electronics that today’s consumers actually own or can easily acquire, such as a general purpose computer . . . and a digital camera,” Appx145(4:35-39), including “various digital devices such as PDAs,” known today as smartphones. Appx147(8:60-62), Appx6150(270:18-19).

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<sup>1</sup> Claims 2-9 depend from claim 1, (15:63-16:35), claims 11-14 depend from claim 10, (16:36-17:16), and claims 16-20 depend from claim 15 (17:17-18:38). Appx151-152(15:39-18:38).

Unlike traditional check deposit systems, the “general purpose computer” used with the ’598 invention “has the ability to run any number of applications that are written for and compatible with the computer’s operating system.” Appx145(4:28-31). The inventors explicitly distinguished their invention from those prior art systems employing “specialized equipment as may be purchased by a business or other commercial enterprise, for example, for the specialized purpose of high-speed, high-volume check deposits.” Appx145(4:31-35).

In the claimed inventions, the installation of the “remote deposit application” transforms the customer device into an effective check depositing system, without the need for any of the specialized equipment previously required to perform the same functions. *See* Appx148(10:53-55) (“[T]he customer downloads component 532 to facilitate a deposit, thereby allowing a financial institution to effectively control certain aspects of the image generation and delivery process.”); Appx146(6:59-61) (“Computer 111 may comprise software that allows the user to control certain operations of the image capture device 112 from the computer 111.”). After the remote deposit application captures the check image and delivers it to the bank’s systems, an image analysis subsystem on the bank’s servers is employed, for example to determine “that the check is valid and not a duplicate, and that the received image can be used to further process the transaction.” Appx149(11:28-35).

## II. Procedural History

### A. PNC sought *inter partes* review of the '598 patent.

PNC petitioned for *inter partes* review of all claims (claims 1-20) of the '598 patent. Although additional prior-art references were addressed before the Board for purposes of some of the claims, only three references are relevant to this appeal: Garcia, Byrne, and Singfield.

#### 1. Garcia

Garcia is an international patent application, describing transmitting digital images of checks from a “mobile device that incorporates a camera” to a financial institution for “validation and deposit into the existing account.” Appx1049(4:11-18). Garcia undisputedly does not disclose the detailed data extraction and verification steps required by the '598 patent. Nor does it suggest that those steps could be performed based on images captured by a mobile phone camera. To the contrary, Garcia repeatedly emphasizes that “*the user*”—*i.e.*, the bank customer seeking to deposit a check—must “enter[] ... the amount of the check and *all the information and codes necessary for the operability of the system.*” Appx1057(12:9-13) (emphasis added); *see also* Appx1059(14:8-18) (“user” must “enter[]” “data associated with the document itself, such as the amount and/or the document number”). Similarly, Garcia discloses that what the user transmits to the bank is both the images of the check as well as, separately, a “data set” that includes the data that the user manually entered. Appx1057(12:9-22); *see also* Appx1059-1060(14:11-

15:5) (requiring that the user enter the “recognition data,” including the “data associated with the [check],” and then that the phone transmit a “digital image and the recognition data” to the depositing bank).

Garcia generally references verification by the receiving institution, *see* Appx1060(15:8-10), and states that the receiving institution has “computer equipment connected to the Internet that has an optical character recognition (OCR) system.” Appx1056(11:10-13). But Garcia never suggests that the images captured by the mobile phone in its system could, much less would, be reliably used to extract the key information from the check. To the contrary, as discussed above, Garcia relies heavily on information entered *by the user*, including relying on the user to manually enter the necessary fields of check amount and check number.

## **2. Byrne**

Byrne discloses a server-based “desktop deposit application” that permits a bank’s customers to connect a specialized check scanner to a desktop PC and access the bank’s website to perform a remote check deposit. *See* Appx1074(¶¶ 47-48). Byrne’s system is able to interface with the check scanner connected to the desktop PC through the use of an “ActiveX control” embedded in the bank website in conjunction with special scanner API software (CLASP). Appx1075(¶ 59), Appx1077(¶ 102). Byrne emphasizes this ActiveX control (also called a “plug-in”)

is present only temporarily on the desktop PC and must be re-acquired every time the customer invokes the desktop deposit software. *See* Appx1074(¶ 46).

### **3. Singfield**

Singfield discloses a specialized check scanner (called a “Wireless Electronic Check Deposit Scanning and Cashing Machine”). Appx1082; *see also* Appx1104(¶ 49) (describing “wireless electronic check scanning device” depicted in Figs. 1A and 1B, including “optional retractable antenna”); Appx1105(¶ 51) (describing “a unique wireless electronic check cashing and depositing scanner”). It includes a physical feeder to ensure checks are properly oriented. Appx1104(¶ 48) (“rolling prongs that receive (by sucking in) checks after scan for quickly scan the next check”). It also includes a magnetic MICR reader. Appx1110(cl. 2) (“magnetic strip and swipe reader that reads data on the check”).

Singfield’s “WEDS” device, in conjunction with its “online account management system (OMS),” permits users to scan and deposit checks remotely. Appx1099(¶ 4). The user begins the process by “log[ging] on to enter the dollar amounts and figures into their [OMS] Account, to initiate and begin process of check deposit request.” Appx1099(¶ 4). The entered data, along with the scanned check images, are transmitted securely to the OMS over a wireless connection. Appx1099(¶ 4). The user then has the opportunity to verify the data on the OMS website before proceeding with the deposit. Appx1099(¶ 4).

**B. The Board found claims 1 and 8-20 of the '598 patent obvious over the combination of Garcia, Byrne, and Singfield.**

The Board instituted an *inter partes* review and found claims 1 and 8-20 of the '598 patent obvious based on PNC's asserted combination of Garcia, Byrne, and Singfield. Appx117.

In requesting institution, PNC's theory centered on Garcia's "handheld mobile device," which a bank customer used to manually enter check data and send a picture of the check to their bank. Appx249-250, Appx255, Appx265. According to PNC, Garcia did "not expressly disclose certain implementation details," and thus "[t]o implement Garcia, a POSITA would have been motivated to find a solution" "to fill th[e] gap[s]" using Byrne and Singfield. Appx260, Appx262, Appx266.

In its Final Written Decision, the Board agreed that "Garcia does not specify all of its implementation details," such as "how the mobile device acquired" the application, and did not disclose "how the payee bank recognizes, verifies, and processes the check deposit." Appx95-96.

With respect to combining Garcia with Byrne, the Board adopted PNC's position that a POSA "would have been motivated to implement Garcia's application by downloading, onto the mobile device, a thin client application, as disclosed by Byrne," based on PNC's expert Dr. Mowry's testimony that "a thin client improves security and ease of software maintenance" and would improve Garcia's device with "predictable results." Appx73-74.

With respect to combining Garcia with Singfield, the Board stated that it “would have merely been a combination of a known technique with a known system to yield predictable results,” and “disagree[d] with Patent Owner’s arguments that the differences between a scanner and a camera would have discouraged the combination.” Appx90, Appx93 (internal citations omitted).

Notably, the Board acknowledged the undisputed evidence that cellphone images were “materially different than one[s] obtained from a traditional check scanner,” such that it was “more challenging to capture a check image of sufficient quality with a camera phone because the resolution, focus, angle, movement, and lighting of the image were unpredictable” and “existing algorithms were not able to reliably and consistently correct for these challenges.” Appx102-104. The Board nonetheless dismissed these facts because the “Garcia-Byrne-Singfield combination [would] be able to deposit a check image in *some*, but not *all*, cases.” Appx102-104. The Board stated that it “need not decide how often the [Garcia-Byrne-Singfield] system would have successfully deposited the check.” Appx104.

The Board did not find (nor did PNC present any evidence) that a POSA would have perceived the combination as sufficiently reliable to function in a deposit system, much less more reliably than any of the prior art solutions. The Board simply dismissed these considerations as somehow irrelevant.



With respect to dependent claims 2-7, which recite certain additional error processing and validation steps performed prior to accepting the check images for deposit (*see* Appx151(15:63-16:28), the Board found that PNC had “*not* shown, by a preponderance of the evidence, that a person of ordinary skill in the art would have been motivated to combine the references” and that “[e]ven if an ordinary artisan *could* have made the proposed combination, we are not persuaded that Petitioner has sufficiently shown that he would have been *motivated* to do so.” Appx105-107, Appx111-112 (emphasis in original). In particular, the Board noted that Garcia did not “contemplate performing error checking in the mobile phone” and found that PNC’s theory that an “ordinary artisan would have been motivated to add error processing to Garcia’s mobile phone so that it could address errors before transmitting the check image” was not persuasive or supported by evidence. Appx107-108. In reaching this conclusion, the Board relied on the admissions of PNC’s expert, who admitted that “[t]here are tradeoffs’ associated with doing the verification processing on either the client or the server” such that a POSA would not have been motivated to implement the claimed functionality. Appx109. The Board also acknowledged that PNC, having the burden of proof on invalidity, was required to show a benefit of the combination from the perspective of a POSA and rejected “Petitioner’s attempt to shift the burden to Patent Owner to determine whether or not [the combination’s] purported benefits would be realized.” Appx110.

USAA timely appealed to this Court as to the Board’s decision on claims 1 and 8-20. Appx743-745. PNC cross-appealed as to the Board’s decision on claims 2-7. Appx820-822.

### **SUMMARY OF ARGUMENT**

The Board’s conclusion that claims 1 and 8-20 of the ’598 patent are obvious over Garcia, Byrne, and Singfield was the product of legal error and is not supported by substantial evidence. Because each of PNC’s asserted obviousness grounds relied on the Garcia-Byrne-Singfield combination, the Board’s error requires reversal with respect to all of the ’598 patent’s invalidated claims.

The petition conceded that Garcia was missing elements of the claims at issue and relied on combinations with secondary references to supply those elements. *See, e.g.*, Appx259. Specifically, PNC’s obviousness theory required finding that a POSA would have been motivated to make at least two changes to Garcia: (1) implement Singfield’s duplicate detection technique, but using images acquired by the mobile device of Garcia rather than the specialized equipment of Singfield, to perform “determining whether the check was previously deposited using the at least one electronic image of the check”; **and** (2) implement Byrne’s “thin client” downloaded app in Garcia, which PNC argued would satisfy the limitations requiring a “remote deposit application” that performs various functions including controlling the camera. Appx266-269; Appx260-266.

The factual record in this IPR does not support either assertion and the Board's findings to the contrary lacked substantial evidence.

First, there was no substantial evidence of record motivating a POSA to implement, in Garcia's system, using the captured electronic check image to "determin[e] whether the check was previously deposited" and to block the deposit if the system "determines from the at least one electronic image of the check that the check was [not] previously deposited," which are required elements of each independent claim. *See* Appx151(cl. 1). In its petition, PNC admitted Garcia did not disclose these features and argued they were suggested by Singfield, *see* Appx266-269. By the reply brief, PNC had narrowed its theory to an argument that a POSA would have incorporated Singfield's disclosure of identifying duplicates by comparing the handwritten "signature" between checks into Garcia's system, *see* Appx603-605. The Board took a broader view and found that Garcia itself "suggest[s]" (although does not disclose) optically reading MICR information from the check image and that a POSA could have used that information to detect duplicate deposits. *See* Appx99.

The Board's conclusion was not supported by arguments or evidence presented by the petitioner PNC. *Cf. In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1381 (Fed. Cir. 2016) ("[T]he Board must base its decision on arguments that were advanced by a party, and to which the opposing party was given a chance to

respond.”). More fundamentally, it was not supported by any substantial evidence. There is no evidence that a POSA would have perceived duplicate detection based on the MICR line of images captured by a system such as Garcia’s as viable, and PNC’s experts expressly testified to the contrary. The only evidence of record teaching duplicate detection was Singfield—which was premised on receiving highly accurate information from a magnetic check reader and/or direct observation of the check document—and academic papers submitted with PNC’s reply brief as purported evidence that the “literature was replete with suitable algorithms” for identifying duplicates based on image analysis. Appx605. The latter assertion evaporated on cross-examination, when PNC’s expert conceded that each of these “suitable algorithms” were for comparing two images together to determine whether they were identical, *see* Appx6199-6202(16:24-17:3, 19:7-12), in contrast with the claims’ requirement to analyze an image of a check and determine whether that same *check* has been previously deposited (i.e., on a different occasion, presumably using a different image of the same check). As USAA’s expert explained, without rebuttal, PNC’s proffered “algorithms” would be useless in the context of the claimed invention, where “even the slightest difference in the positioning of the check relative to the capture device between images” would cause a failure to identify the images as duplicates, “even if, in fact, both images were of the exact same paper check.” Appx672; Appx5916(¶ 42). PNC’s *only* argument that Singfield taught

duplicate detection using image analysis was based on its disclosure that the “signature” may be used, an approach that the un rebutted evidence developed during the proceeding confirmed would fail with even the slightest inaccuracy in document orientation. PNC’s own experts testified that it was “unpredictable” and “uncontrolled” with “a number of problems such as skew or warping” resulting when using a “mobile device to take a picture of an image” as in Garcia’s system. Appx6042(939:5-18); Appx5583(43:9-19).

Second, there was no substantial evidence supporting the combination of Garcia and Byrne, the only alleged basis for the “computer application [] provided ‘for download to the mobile device’ that “provides a ‘user-interface’ and ‘control[s] a camera associated with the customer device,’” elements present in every independent claim. PNC conceded that Garcia did not disclose those elements, and therefore relied entirely on Byrne. *See* Appx260 (“Garcia in view of Byrne teaches these features.”). PNC asserted that a POSA would have been motivated to use Byrne’s “plug-in(s) distribution technique,” because of benefits of that approach purportedly taught by Byrne: “improvement in ‘security’ and ‘ease and speed of software maintenance.’” Appx262-263. These assertions did not hold up to scrutiny. When read in context, Byrne’s asserted benefits of improved “security” and “ease and speed of software maintenance” were only described as improvements relative to a prior art alternative involving distributing software to clients via CD-ROMs and

floppy disks. PNC offered no evidence that a skilled artisan would have favored Byrne’s method of software distribution when she could have instead used a cellphone’s web-browser and its preinstalled camera software, which the undisputed evidence shows would have been the typical approach used by a POSA to implement Garcia’s disclosure at the time. In fact, the evidence showed that for all of the “benefits” the petition relied on as motivating a POSA to combine Garcia with Byrne, the proposed combination would have actually been worse than Garcia itself.

The Board did not reach its result by crediting contrary evidence from PNC on these points;<sup>2</sup> instead, it concluded, based on the *In re Fulton* line of cases, that the “case law does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention.” See Appx79 (quoting *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) and subsequent cases). But that line of cases is only applicable in situations where a patentee argues that POSA would not have implemented the asserted combination because a different approach would have

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<sup>2</sup> Although not argued by PNC, the Board determined on its own accord that a POSA would not have understood Garcia’s described steps to be performed by “different applications” (e.g., a camera app and a browser app) because “Garcia indicates that its application performs all steps.” See Appx78-79 (citing Appx1054-1055(9:19-10:18))). But the cited portion of Garcia states that “[t]he ***equipment required by the user must allow:***” followed by the recited steps; it never states that all steps are performed by a single “application.” See Appx1054(9:19). Indeed, the “computer application” is referenced only for one step out of seven. See Appx1054-1055(9:21-10:3).

been better. Here, PNC’s obviousness theory was premised on the assertion that a POSA would have implemented a secondary reference’s teachings in order to “improve” the base reference, but the record evidence showed a POSA would **not** actually expect those benefits to materialize. While the proposed combination need not be the “most desirable” implementation in all of the prior art, there must nevertheless be some rational reason a POSA would have found it obvious to combine the references, beyond the mere possibility of doing so, or hindsight reconstruction of the claims. *See, e.g., In re Van Os*, 844 F.3d 1359, 1361 (Fed. Cir. 2017) (“Absent some articulated rationale, a finding that a combination of prior art would have been ‘common sense’ or ‘intuitive’ is no different than merely stating the combination ‘would have been obvious.’”). The Board’s logic would instead render obvious every invention whose elements exist in the prior art and can theoretically be combined—an outcome that cannot be squared with the law of obviousness. *E.g., KSR Int’l. Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (“[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.”); *Belden Inc. v. Berk-Tec LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made but would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”) (emphasis in original).

Finally, in addressing each of these issues, the Board incorrectly dismissed several of USAA’s arguments as improperly presented in a sur-reply brief. *See* Appx78, Appx93. Here, the Board abused its discretion; the arguments it rejected were both introduced in the Patent Owner Response and properly raised in sur-reply to respond to new arguments, evidence, and expert testimony introduced with PNC’s Petitioner Reply brief. *See, e.g., Chamberlain Grp., Inc. v. One World Techs., Inc.*, 944 F.3d 919, 925 (Fed. Cir. 2019) (“Parties are not barred [under PTAB rules] from elaborating on their arguments on issues previously raised.”). The Board’s conclusory fallback statements that, e.g., “even if [Patent Owner’s] argument had been properly raised, it would not be persuasive because Patent Owner does not identify persuasive evidence to support its position,” do not suffice to provide adequate reasons and bases for the Board’s decision. *See, e.g., Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1046 (Fed. Cir. 2017) (“PTAB cannot satisfactorily make a factual finding and explain itself by merely summariz[ing] and reject[ing] arguments”). The Board’s error here thus requires, at minimum, vacatur and remand for consideration of the full record by the Board in the first instance.

### **STANDARD OF REVIEW**

This Court “review[s] the Board’s conclusions of law de novo and its findings of fact for substantial evidence.” *In re NuVasive, Inc.*, 841 F.3d 966, 971 (Fed. Cir. 2016) (citing *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015)).



“The substantial evidence standard asks ‘whether a reasonable fact finder could have arrived at the agency’s decision,’ and ‘involves examination of the record as a whole, taking into account evidence that both justifies and detracts from an agency’s decision.’” *TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1358 (Fed. Cir. 2019) (quoting *In re Gartside*, 203 F.3d 1305, 1312 (Fed. Cir. 2000)).

Whether the claimed invention is unpatentable as obvious depends on whether the “differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made.” *KSR Int’l Co.*, 550 U.S. at 406 (quoting 35 U.S.C. § 103(a)). Obviousness “is a question of law that is reviewed de novo, based on underlying findings of fact reviewed for substantial evidence.” *Redline Detection, LLC v. Star Envirotech, Inc.*, 811 F.3d 435, 449 (Fed. Cir. 2015) (citing *In re Gartside*, 203 F.3d at 1316). And when reviewing the Board’s claim constructions, this Court “review[s] for substantial evidence any subsidiary factual findings involving extrinsic evidence” but reviews de novo the “ultimate claim constructions and any underlying determinations based on intrinsic evidence.” *Polaris Innovations Ltd. v. Brent*, 48 F.4th 1365, 1372 (Fed. Cir. 2022).

This Court “review[s] the Board’s application of its own procedural rules for abuse of discretion.” *Chamberlain Grp.*, 944 F.3d at 924. “The Board abuses its discretion if the decision: (1) is clearly unreasonable, arbitrary, or fanciful; (2) is

based on an erroneous conclusion of law; (3) rests on clearly erroneous fact findings; or (4) involves a record that contains no evidence on which the Board could rationally base its decision.” *Id.* at 924 (quoting *Ultratec, Inc. v. CaptionCall, LLC*, 872 F.3d 1267, 1272 (Fed. Cir. 2017)). For example, the Board abuses its discretion when it fails to give patent owners “notice of and a fair opportunity to meet the grounds of rejection,” including “to respond to those arguments” raised in petitioner’s reply brief and to “elaborate[e] on their arguments on issues previously raised [e.g., in the patent owner response].” 944 F.3d at 924-925.

## ARGUMENT

### **I. No substantial evidence supports finding that a POSA would have been motivated to combine Garcia with Singfield to “determin[e] whether the check was previously deposited using the at least one electronic image of the check” with a reasonable expectation of success.**

PNC argued that a POSA would have been “motivated . . . to incorporate Singfield’s techniques for duplicate check detection into Garcia, including: a ‘computer program’ that ‘scans the entire bank database to process an automated search to verify no like items have been requested’ ‘before [the] entire transaction process begins.’” Appx267. But Singfield’s “techniques for duplicate check detection” are based on collecting information from sources other than a captured check image; namely, using Singfield’s incorporated “magnetic strip and swipe reader that reads data on the check,” Appx1110(cl. 2), or human-entered data. PNC’s expert conceded that reading information with a magnetic reader is distinct from

determining it optically from an image, and that “Singfield does not discuss explicitly reading the routing and account number optically.” Appx5017(94:8-12), Appx5028-5029(105:22-106:3). PNC’s expert also conceded that Singfield discloses human entry of the data. *See* Appx5034(111:12-15). The claims, by contrast, specifically require making the determination of whether the check was previously deposited using the “at least one electronic image of the check.” *See* Appx151(cl. 1).

PNC attempted to deal with this deficiency by arguing, in its reply brief, that Singfield refers to an embodiment that uses a “signature” for its duplicate comparison process, which is part of the image. *See* Appx604. But PNC presented no evidence supporting a finding that a POSA would have reasonably expected a signature-based duplicate detection process to be successful when implemented into Garcia’s system using check images captured by mobile phones. Singfield itself cannot supply that evidence, because Singfield’s system uses a check scanner rather than a cellphone. *See* Appx1103(¶ 32). The only other evidence proffered by PNC on this point is the academic papers relied on by Dr. Mowry in his reply declaration, purportedly showing that the “literature was replete with suitable algorithms” for identifying documents with identical signatures. *See* Appx605. But as Dr. Mowry conceded on examination, these allegedly “suitable” algorithms related to a different technique altogether: comparing two *images* together to determine whether they

were identical. *See* Appx6199-6200(16:24-17:3), Appx6202(19:7-12). The claims at issue here require analyzing an image submitted of a check for deposit and determining whether that same check *document* has been previously deposited (i.e., on a different occasion, using a different image of the same check). As USAA’s expert explained, PNC’s algorithms would be useless in the context of the claimed invention, where “even a slight difference in the positioning of the check relative to the capture device between images” would cause a failure to identify the images as duplicates, “even if, in fact, both images were of the exact same paper check.” Appx672; Appx5916(¶ 42).

PNC did not present competing evidence addressing this issue; indeed, its IPR expert, Dr. Mowry, testified that he did not even consider the fact that Singfield’s system utilized a check scanner, rather than a camera on a mobile phone, believing that “the details of that [were] not important.” Appx5014(91:21-24). Meanwhile, PNC’s other experts hired to opine on the state of the art in the district court testified consistently with USAA’s IPR expert that at the time of the invention, those of skill in the art perceived a tremendous difference between image capture using a 2-dimensional device (such as a flatbed scanner, as employed in Singfield) and a 3-dimensional device (such as a mobile phone, as employed in Garcia). For example, PNC’s banking expert Mr. Peterson testified that “[t]he relevant aspects of the art are unpredictable because, as a consequence of moving from the controlled

environment of a scanner to the uncontrolled environment of a camera, there's no way to predict numerous important aspects of check images, including the background, the lighting, the angle and the amount of movement of the camera when the photos were taken." Appx5583(43:9-19). PNC's invalidity expert, Dr. Kia, similarly explained how "when the check is presented to a scanner, it's a controlled environment. ... When the check is placed on top of the glass of the scanner, it is flat. And when you close the top, it is flat, it is registered with the scanner as to where the focus of the image is, there's controlled lighting, there is high resolution, and you get a very predictable result by using a scanner; whereas ... as the consumer positions [a] mobile device to take a picture of an image, it is operating in an open 3-D space, so it would result in a number of problems such as skew and warping and a lot of other different problems." Appx6042(939:5-18); *accord* Appx5923(¶ 46) (USAA's Dr. Creusere explaining that image skew "is of little concern in a check scanner that can read the magnetic ink directly from the check and has a built-in feeder to align the check properly," but that "it would create serious problems for a cell phone camera-based implementation like the one in [PNC's] proposed combination, which does not include any functionality that would account for or correct document skew errors"). Thus, from the perspective of a POSA, the existence of document skew and other image inconsistencies in the combined Garcia/Singfield system—employing a cell phone camera as its imaging device—would be a virtual

certainty, making a signature-based duplicate detection approach unworkable. *Cf. Raytheon Technologies Corporation v. General Electric Company*, 993 F.3d 1374, 1381 (Fed. Cir. 2021) (“[T]he evidence of record must still establish that a skilled artisan could have made the claimed invention.”).

In its decision, the Board downplayed the signature-comparison theory actually asserted by PNC and relied instead on its own theory, not advanced by PNC, that Garcia’s disclosure “does not teach . . . [but] does suggest” extracting check information “such as information from the MICR line like the routing and account numbers” using OCR, and that this information could be used to identify duplicate deposits. *See, e.g.*, Appx86, Appx99. In doing so, the Board erred by not confining itself to the arguments and evidence actually presented by the petition, which the Board conceded “specifically proposes that Garcia’s payee bank performs *Singfield’s duplicate check detection*.” Appx86; *see also In re Magnum Oil Tools Int’l*, 829 F.3d at 1381 (“[T]he Board must base its decision on arguments that were advanced by a party . . .”). But even if the Board properly relied on this new rationale for the combination, its conclusion lacked support in the evidence of record.

As with the signature-comparison theory discussed above, PNC introduced no evidence that a POSA would have reasonably expected duplicate detection based on MICR line information optically-read from an image captured by a mobile phone to be successful. Its IPR expert, Dr. Mowry, was unable to identify any evidence

showing that MICR information could be successfully extracted from a cameraphone-captured check image in the prior art. *See* Appx4960(37:2-14) (“Q. Do you cite in your report any article showing the successful reading of a MICR line on a check image captured from a consumer device by a bank OCR system? Do you cite any evidence that evidences that? ... A. I don’t see anything that I cite specifically in my report for the scenario you described.”). PNC’s district court experts testified similarly that at the time of the invention, “the image *need[ed] to be of sufficient quality* so that the OCR engine can do its job,” and that the “quality of mobile phones in 2006 was *not sufficient* . . . to successfully decode those fields and be depositable.” Appx6040-6041(937:21-938:24). Thus, PNC’s other experts concluded (after analyzing the same Garcia, Byrne, and Singfield references presented in the petition) that it would *not* have been obvious for a POSA to use Garcia’s equipment in the way suggested by the Board:

Q. Sir, it was predictable to be able to use cameras to successfully deposit check images in 2006; correct?

A. I stand by my statement in the report.

Q. Sir, it was predictable; correct?

A. I disagree.

. . .

Q. Sir, in 2006 it would have been obvious that a person of skill could create a system that used consumer digital cameras to successfully deposit checks; correct?

A. I disagree.

Appx5583-5584(43:18-44:2), Appx5664(124:20-25). Moreover, they admitted that it was *USAA* who ultimately solved these problems, which the ordinary skilled artisan *could not solve* at the time of the invention:

Q. What is required in order to solve the challenges or problems of obtaining check images of sufficient quality using a mobile phone?

A. You have to develop new algorithms and you have to test them to be able to come up with a solution that addresses these challenges.

...

Q. Doctor Kia, would a person of ordinary skill in the art in 2006 have known about the algorithms that USAA developed to deal with these challenges?

A. No, they would not.

Appx6044(941:13-25), Appx6046(943:4-7); *cf. ABS Global, Inc. v. Inguran, LLC*, 914 F.3d 1054, 1069 (7th Cir. 2019) (“An inventor who finds a way to make workable an alternative that had been rejected as impracticable has done more than implement an obvious combination.”).<sup>3</sup>

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<sup>3</sup> The Board also relied on what it incorrectly characterized as an admission by USAA that Garcia’s disclosure was enabling. Appx98(n.29). But what USAA argued is that Garcia was enabling for its specific disclosure of a system of remote check deposit *dependent on manual data entry*; USAA contested that Garcia enabled a system of remote check deposit *based on data extracted from the check image*, as required by the claims here. *See* Appx100 (“Patent Owner ... argu[ed] that ‘there is nothing in Garcia indicating that it had the ability to successfully extract the



USAA also introduced evidence in its Patent Owner Response, which went uncontested by PNC, that at the time of the invention a POSA understood from industry white papers that, among other things, “small skew angles can seriously impact . . . OCR” of check images and that a skew angle of as few as “2 to 3 degrees . . . can result in “inability to create a complete substitute check” (as doing so requires accurately capturing critical check information including MICR line information). *See* Appx559-560; Appx5474. As discussed above, the testimony of PNC’s own experts established that a POSA expected images captured by mobile phones such as Garcia’s to come with a number of problems including “skew and warping.” *See* Appx6042(939:5-18). Yet PNC offered no explanation, much less record evidence, showing how a POSA would have reasonably expected MICR line information extracted via OCR in Garcia’s system to be suitable for detection of duplicate deposits as required by the ’598 patent claims. The Board’s cursory finding of obviousness based merely on its theory that there is a “suggestion” in Garcia (although never stated as such in the reference) to attempt to optically read MICR

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information necessary for check deposit from the image.”) (quoting Appx501); *see also* Appx507 (“The Petition and Dr. Mowry start from the premise that Garcia’s images must be readable because the checks get deposited. That was not the state of the art in 2006. . . . [Garcia] did not concern [itself] with whether the image was machine readable but still effected deposits using the image.”). PNC recognized that this was USAA’s position. *See* Appx585 (recognizing that USAA argued that “Garcia does not actually teach remote check deposit using a camera phone”).

information was not founded in substantial evidence and should be reversed.

**II. No substantial evidence supports finding that a POSA would have been motivated to combine Garcia with Byrne’s “thin client” application with a reasonable expectation of success.**

The Board found that a POSA implementing Garcia would turn to Byrne for “implementation details,” and that Garcia and Byrne “lend themselves to ... combination because Garcia and Byrne both describe remotely depositing a check via the Internet using software on a user’s device.” Appx96, Appx74. But in its petition, PNC’s asserted combination relied on Byrne to teach a specific modification: namely, to “provide Garcia’s mobile device with ‘*a remote deposit application for download to a customer device*’ that ‘*provide[s] a user-interface*’ and ‘*control[s]*’ Garcia’s camera.” Appx261 (emphasis in original). According to the petition, a POSA would have been motivated to make this combination because Byrne purportedly taught that distributing a “thin client” computer application to control a device had benefits of reducing maintenance and storage burdens on the remote device, reducing bandwidth usage, and improving security. Appx262-264.

The Board, however, ignored the context of Byrne’s alleged improvements as they relate to the motivation actually alleged by PNC. Byrne discloses delivering specialized software for personal computers to control an attached check scanner, and Byrne asserted that its “thin client” approach reduced maintenance and storage burdens and improved security *relative to alternative methods of delivering such*

*software*, i.e., via CD-ROM or floppy disk. Appx1075(¶ 61). Byrne’s disclosure does not motivate its combination with Garcia because Garcia’s method already employs a cellphone with a built-in camera. There is no dispute that a POSA understood the cellphone to include preinstalled software for controlling the camera, e.g., Appx1051(6:12-20). Therefore, the only motivation of delivering the software without the need for CD-ROM or floppy disk is totally irrelevant to Garcia, since software to “control Garcia’s camera” was already present and never required such delivery methods.

In fact, the evidence showed clearly that with respect to the alleged “benefits” that petitioner contends would have motivated a POSA to combine Garcia and Byrne, the combination actually would have been inferior to Garcia’s existing approach. *See* Sections II.A-II.B, *infra*. The Board’s primary response to this argument was to dismiss it as forfeited. *See* Appx78. The Board’s forfeiture finding was error, as USAA presented its challenge to PNC’s motivation to combine theory in the Patent Owner Response and appropriately developed the argument further in its Patent Owner Sur-Reply in direct response to the arguments raised by PNC in its Petitioner Reply and the accompanying reply expert declaration and deposition testimony. *See* Section III.A. And while the Board also purported to evaluate and reject USAA’s arguments in the alternative, *see* Appx78-79, it did so based on an

incorrect understanding of the law and by improperly shifting the burden of proof from petitioner PNC to USAA.

**A. Garcia taught a different approach to remote deposit from Byrne’s “thin-client” application.**

Byrne is directed to a “Desktop Deposit” system where a desktop computer accesses and controls external hardware for capturing images of checks, specifically a check scanner, which the art taught was controlled via a particular type of software interface (such as the commercially-available “Ranger API”). Appx1077(¶¶ 136-139). For instance, it could be desirable for “[e]ach check [to] be marked with indelible ink, if the scanner is so equipped, indicating that the check has been electronically processed.” Appx1074(¶ 48). Likewise, Byrne’s method allowed the bank customer “to direct said device [the scanner] to selectively extract additional information from each said captured object.” Appx1079(cl. 1) (emphasis added). *See also* Appx4775 (explaining that the thin-client API used by Byrne “allow[ed] the application developer to call the underlying scanner-specific interface *to access unique hardware features*”) (emphasis added).

Since these capabilities didn’t exist natively on desktop computers, the software had to be customized to coordinate with third-party check scanners.<sup>4</sup> *See*,

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<sup>4</sup> The desktop might be a Windows PC—*see* Appx1078(¶ 150) (“The operating systems supported are Windows XP and Windows 2000.”)—and thus be manufactured by Microsoft, Dell, etc., whereas the external check scanner might be manufactured by Panini, RDM, etc. *See* Appx1078(¶ 152), Appx1074(¶ 48).

*e.g.*, Appx4775 (explaining that “Ranger [API] gives you the flexibility to use check scanners manufactured by different vendors, without making any changes to your applications”).

This is in stark contrast with Garcia. In Garcia the ability to access and control a camera existed natively on the mobile camera phone. Dr. Mowry, PNC’s primary expert during the IPR proceeding, conceded that “you would expect Garcia’s phone to have a camera application already preinstalled on the device that could control the device camera and take a picture of things.” Appx6207(24:18-22).

Garcia’s method only requires the cellphone to take a photo of the check and send the photo to the bank, which Dr. Mowry conceded could be accomplished using the web browser that was standard in such devices at the time. *See* Appx4945(22:6-10) (“Mobile browsers” could “set up interactive session between a mobile phone and a company.”), Appx4946(23:3-11) (“a browser, including a mobile browser, is a piece of software”). In other words, nothing in Garcia’s method suggests (much less requires) downloading any application; as Dr. Mowry admitted, “mobile cameras, mobile phones and devices with cameras in 2006, they all used [built-in] drivers to control their camera.” Appx4978(55:1-19). He contrasted this with Byrne’s approach of “having a remote server control something [i.e., with a thin-client API], that depends on having distributed software where your client is interacting cooperatively with a server,” admitting that these two approaches “really

are two separate things. There's the device driver applying something to control the camera and then separately having this collaboration between the server and the client for that to happen." *Id.*

**B. The alleged benefits motivating the Garcia/Byrne combination were contradicted by the evidence.**

In view of Dr. Mowry's testimony, the undisputed record evidence was that a POSA reading Garcia would understand its methods to be implemented using the then-typical approach; i.e., using camera's built-in camera software to capture check images and using a web browser to transmit those images (and other data manually entered by the user) to the bank. Appx5903-5904(¶ 30). Garcia itself suggests nothing more. *See* Appx1049(4:11-18) ("The present invention ... us[es] a mobile device that incorporates a camera, capable of capturing and transmitting digital images, as well as performing the usual telephony operations."). The Board appeared to misconstrue USAA's argument to mean that Garcia must be implemented using a web browser, an argument it rejected because of the lack of the word "browser" in Garcia's disclosure. *See* Appx96-97. The relevant question is what Garcia's disclosure suggests to one of ordinary skill in the art; here, it was uncontroverted that a POSA would understand the functionality disclosed by Garcia as implemented on a mobile device (e.g., uploading captured images and other input information to a bank server via an interactive "session") to be the kind of functionality one would typically implement using a web browser. *See* Appx5903-5904(¶ 30),

Appx6206(23:15-19). PNC itself argued in the petition, in view of Garcia's disclosure, that it was known in the art to "use[] a mobile telephone connected to the Internet, which displays an institution's menus and forms," that it would have been natural to combine Garcia with Byrne because Byrne also described an "interface between the user and the enterprise . . . that allows a bank customer to . . . deposit the checks via the [Internet] browser." Appx264; *see also* Appx263-264 (asserting that "Garcia's computer application performs the same function as Byrne's [browser] plug-in(s)" and "the steps performed during Garcia's interactive session are substantially similar to those performed during Byrne's session.").

Here, PNC chose to use the purported benefits of a "thin-client" design as an alleged motivation to combine Garcia with Byrne, on the theory that this would obtain benefits purportedly taught by Byrne. However, no record evidence ultimately supported that position. PNC identified the alleged benefits of a thin-client approach *vis-à-vis* a *fat-client* approach. But the fat-client is a strawman. As Dr. Mowry characterized fat applications, the "fat application approach ... was something that arose in the very early days of, say, personal computers where we would have floppy drives, or later, CD ROM drives." Appx6215(32:4-7). With Byrne, that's how bank customers had previously connected with their scanners. *See* Appx1075(¶ 61) ("A clear advantage the invention provides to the enterprise and to the customer is the efficiency provided by the enterprise not having to ship CDs and

the like to customers.”).

While Byrne teaches that thin clients may hold advantages over fat clients—according to PNC, “memory savings, enhanced security, and improved software maintenance,” Appx599—these advantages disappear when thin clients are compared against Garcia’s approach. In fact, the proposed combination of Garcia/Byrne is actually neutral or worse than Garcia alone with respect to all of the alleged “strongest reasons to combine Garcia and Byrne,” *id.*, as summarized in the table below and discussed in detail below.

	<b>Garcia</b>	<b>Garcia + Byrne</b>
<b>Software Installed on User Device (Maintenance/Storage Costs)</b>	Camera software Web browser	Camera software Web browser
<b>Software Downloaded with Each Invocation (Bandwidth Cost)</b>	None	Browser plug-in
<b>Permissions Granted to Third Party Software (Security Cost)</b>	None	Remote control of camera, user-interface

When it comes to the software installed on the user’s device (i.e., software that takes up storage space and must potentially be updated/maintained), the Garcia/Byrne combination is bulkier. Both Garcia and the Garcia/Byrne combination require a web browser and a camera application or other software to control the image capture device, but in the method taught by Garcia, this is the only software required by the user device—period. Appx5903-5904(¶ 30). Meanwhile,



the Garcia/Byrne combination requires additional software that must be downloaded with each invocation of the deposit application, i.e., the browser plug-in or “thin client,” which comes with a bandwidth cost.<sup>5</sup> And because that plug-in must remotely provide a user-interface and control the device camera in the Garcia/Byrne combination, the plug-in requires permissions to access the device’s resources. Appx1074(¶ 46); Appx4978(55:1-19).<sup>6</sup> These may be less onerous than those required by a “fat application,” but they are nonetheless a security concern that Byrne teaches is undesirable—and which are avoided entirely by Garcia’s approach of uploading locally-captured images to a bank website. Appx5903-5904(¶ 30).

PNC’s identified motivations thus cannot support a finding of obviousness.

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<sup>5</sup> In a footnote, the Board wrote that “even if this argument had been properly raised, it would not be persuasive because Patent Owner does not identify persuasive evidence to support its position.” Appx73(n.14). But this cursory dismissal both fails to identify the reasons and bases for the Board’s decision and improperly shifts the burden of persuasion to the patentee. *Cf. Icon Health & Fitness*, 849 F.3d at 1046 (“PTAB cannot satisfactorily make a factual finding and explain itself by merely summariz[ing] and reject[ing] arguments”). USAA’s argument was grounded in expert declarations (including admissions of PNC’s own expert) and highlighted the inconsistency in, and lack of evidence for, PNC’s motivation to combine theory. Even the Board agreed, elsewhere, with the evidentiary underpinnings of USAA’s argument. *See* Appx109 (explaining that “[i]n Petitioner’s proposed combination, Byrne’s thin client application would be downloaded to Garcia’s mobile phone at each use (*which would require communication resources and incur latency*)”) (emphasis added).

<sup>6</sup> Petitioner’s expert asserts that “security” is “important when granting third-party software to sensitive system resources, *like a camera*.” Appx3741(¶ 35) (emphasis added).

*See, e.g., Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1329 (Fed. Cir. 2019) (affirming finding of non-obviousness where “disadvantages [of combination] outweighed the uncertain benefits” as compared to the primary reference alone); *Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 & n.8 (Fed. Cir. 2000) (“Trade-offs often concern what is feasible, not what is, on balance, desirable. Motivation to combine requires the latter. . . . [T]he benefits [of the combination], both lost and gained, should be weighed against one another.”). The lack of evidence that the asserted combination would be “on balance, desirable” is even more striking here where the “disadvantages” of the combination contradict the very “benefits” upon which PNC premised its petition. For example, a panel of this Court reached a similar conclusion in *Arctic Cat Inc. v. Polaris Industries, Inc.*, 795 F. App’x 827 (Fed. Cir. 2019), where it noted that while a challenger “need not prove that there was a known problem with the prior art in order to demonstrate that there was a motivation to combine prior art references,” the petitioner must nonetheless “prove the facts that it alleged” as evidencing a motivation to combine, and that “[petitioner’s] case was doomed when it failed to prove the premise it offered for combining [the references]” including failing “to explain how the drawbacks of the modification[] would be overcome.” *See id.* at 833.

Critically, in addition to the disadvantages of the combination, the very purported benefits that PNC’s expert describes as the “strongest reasons to combine

Garcia and Byrne” in his reply declaration would be applicable to Garcia alone, without the combination. As PNC’s expert admitted:

Q. And so the reason for that [software maintenance] benefit is that there’s essentially only one version of the thin client that exists at the—let’s say at the bank, and the clients download that version each time they want to go through this deposit process?

A. Yes. An advantage of that approach is that the people who develop and distribute software don’t have to worry about clients using very stale versions of the software. So yes, that’s correct.

Q. And that same principle would apply to what we sometimes refer to as a ‘web application’ that’s just implemented via a web page; right?

A. Yes. You could say that. ... [A]n advantage of going to a web page and downloading code is you’re getting an up-to-date version of the code.

Appx6212-6213(29:19-30:11). Similarly, despite PNC’s argument that the combination would have purported “efficiency” gains, Dr. Mowry was unable to say that adding Byrne’s teachings would make Garcia any more efficient. *See, e.g.*, Appx5168(245:2-21) (“Q. Is the thin client part of Byrne more efficient than what currently exists in Garcia? A. There’s not a way to answer that . . . Q. Is the thin client in Byrne more efficient than what currently exists in Garcia? A. It’s unclear. It may or may not be more efficient.”).

The Board acknowledged, but dismissed all of this evidence against the combination on the theory that Board “evaluate[s] whether Petitioner’s proposal would have been obvious, not whether it would have been the ‘most’ obvious implementation of Garcia.” Appx79. But this restatement of the law is incomplete. While an “inferior combination” can be used to show obviousness, *Dome Patent*

*L.P. v. Lee*, 799 F.3d 1372, 1381 (Fed. Cir. 2015), the combination must still be desirable to a POSA as compared to the prior art, without the benefit of hindsight. To establish obviousness, “particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.” *In re Kotzab*, 217 F.3d 1365, 1371 (Fed. Cir. 2000); *see also Belden Inc.*, 805 F.3d at 1073 (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”). Indeed, the Board acknowledged this legal requirement in other aspects of its decision, noting (correctly) that it was PNC’s burden to “determine whether or not [the combination’s] purported benefits would be realized” and finding that PNC had failed to satisfy that burden to show, for example, “whether the net result of [its] proposed combination would be reduced bandwidth or decreased delays.” *See* Appx109-110.

Here, however, there were no clear and specific findings of any reason that a POSA would have believed it desirable to modify Garcia to produce the Garcia and Byrne combination. The Board accepted PNC’s argument that “[t]here were a finite number of identified ... solutions,” and compared to “installing the application from media such as CD-ROMs,” a thin-client would have been appealing, Appx266, and thus the Board concluded that even if “better alternatives” existed, the combination

was still obvious. Appx79. But as discussed above, the evidence of record showed that for each type of “benefit” alleged by PNC to motivate the combination with Byrne, the asserted combination would have been *worse*, or at best neutral, compared to the status quo. In other words, PNC’s theory as expressed in its petition was that a POSA would have been motivated to implement Byrne’s techniques into Garcia to reduce maintenance/storage requirements, reduce bandwidth usage, and improve security. *See* Appx262. But PNC presented no evidence (nor does the Board cite any purported evidence) that the combination would actually reduce maintenance/storage requirements, reduce bandwidth usage, or improve security compared to Garcia’s existing approach. In fact, PNC’s expert’s testimony demonstrated that the combination would use *more* storage, more bandwidth, and require “granting third-party software [access] to sensitive system resources, like a camera,” which petitioner’s expert describes as a security risk. Appx3741(¶ 35). *Cf. Henny Penny*, 938 F.3d at 1329 (affirming Board’s finding of non-obviousness where “disadvantages [of combination] outweighed the uncertain benefits”). Thus, the question facing the Board was not whether the alleged combination was the “best” solution, but whether the alleged combination was a *solution at all* to the problems that Petitioner itself was contending would motivate a POSA to implement the combination. Neither the Petition nor the Board’s decision identify evidence of record sufficient to support a finding of obviousness. *See Arctic Cat Inv.*, 795 F.

App’x at 833 (“Arctic Cat tried to create a problem with the prior art in hopes of creating a motivation to combine references, but it failed. ... Arctic Cat’s case was doomed when it failed to prove the premise it offered for combining [the references].”); *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1069 (Fed. Cir. 2018) (vacating the PTAB’s finding of obviousness when the Petitioner’s combination “would run contrary to one of [the primary reference’s] stated purposes”); Appx1052(7:18-20) (touting the Garcia system’s “greater simplicity, speed, and security”).

**C. The Board’s analysis of Garcia in the Final Written Decision was based on a faulty premise.**

Although not argued as such by PNC, the Board determined in its Final Written Decision that “in the relevant time period, mobile phones did not have pre-installed software that could perform all steps [described by Garcia], as a web browser could not capture images.” Appx79. From this it concluded that a POSA would have chosen to implement Garcia on a standalone thin app that would *itself* perform every step, rather than through a browser application that *invoked* the native camera control application, in an attempt to avoid the problems inherent in PNC’s asserted rationale for combination. But this conclusion is completely inconsistent with the record evidence and PNC’s own arguments.

First, the Board’s finding that “Garcia indicates that its application performs all steps,” Appx78-79, citing Garcia’s disclosure at 9:19-10:18, was never argued by

PNC and misreads Garcia. The cited disclosure states that “[t]he equipment required by the user must allow: . . .” followed by the series of steps to be performed, including “capturing the digital image.” *See* Appx1054-1055(9:19-10:11). The “computer application” is required only in the first step, “in which an interactive session is established with the receiving institution.” *See* Appx1054-1055(9:21-10:3). As explained by both parties’ experts, establishing an “interactive session” is functionality typical of mobile web browsers of the time. *See* Appx4945(22:6-10) (“Mobile browsers” could “set up interactive session between a mobile phone and a company.”); Appx5903-5904(¶ 30). That is consistent with Garcia’s explanation of its required “equipment,” which is not an “application” but rather “consists of a mobile telephone equipped with the features and functions necessary for said purpose [capturing, digitizing, and processing the image], particularly a mobile telephone with camera and processing capacity.” Appx1056(11:1-6).

Second, it disregards the testimony of PNC’s expert Dr. Mowry, who admitted that a mobile application that needs to control the camera can simply invoke the phone’s native camera control API, Appx6207-6208(24:24-25:13), and that “you would expect Garcia’s phone to have a camera application already preinstalled on the device that could control the device camera and take a picture of things,” Appx6207(24:18-22).

Third, it disregards PNC’s own arguments that Byrne “allows a bank

customer to ... deposit checks *via the browser*,” Appx261 (quoting Appx1074(¶ 41)),<sup>7</sup> and that a POSA would have followed Byrne’s teachings in the combination with Garcia, Appx303. It also disregards PNC’s Petitioner Reply, where PNC conceded that a POSA could “implement[] Garcia using a web browser.” Appx598.<sup>8</sup>

The Board cannot substitute its own unfounded opinion for the facts of record, particularly those admitted by the petitioner itself. *See, e.g., In re Magnum Oil Tools Int’l*, 829 F.3d at 1381 (holding PTAB lacks authority to “decide unpatentability theories never presented by the petitioner and not supported by record evidence”); *PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (“[P]etitioner’s contentions . . . define the scope of the litigation all the way from institution through to conclusion.”).

### **III. The Board abused its discretion in rejecting USAA’s arguments responding to PNC’s reply brief.**

The Board rejected several of USAA’s arguments as “forfeit” because they were purportedly “not raised in Patent Owner’s Response and [] not fairly responsive

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<sup>7</sup> *See also* Appx303 (PNC explaining that Byrne’s bank customer “‘deposit[s] the checks *via the browser* to a bank account’”) (quoting Appx1072(¶ 3)) (emphasis added).

<sup>8</sup> On this point, the only difference between Patent Owner USAA’s position and PNC’s position is PNC’s contention that “host[ing] an interactive session [on a web browser] to access the mobile camera” “would *require* Byrne’s technology.” Appx598. But PNC’s position contradicts the testimony of its own expert. A camera control API would *not require* a thin client solution because camera control APIs exist natively on mobile phones. Appx6207-6208(24:24-25:13).



to Petitioner’s Reply.” *See, e.g.,* Appx78. As discussed further below, in each instance, the rejected argument was in fact introduced in USAA’s Patent Owner Response and raised in Sur-Reply in response to arguments, evidence, and expert testimony presented in the Petitioner’s Reply. The Board’s overly zealous restriction of sur-reply argument, in contravention of its own rules and this Court’s precedents, was an abuse of discretion. *See* 37 CFR § 42.23(b) (permitting sur-reply to “respond to arguments raised in the corresponding reply” and to be “accompanied by . . . deposition transcripts of the cross-examination of any reply witness”). As this Court has held, even as late as oral argument, “[p]arties are not barred from elaborating on their arguments on issues previously raised” and “clarification of [patent owner’s] prior position in response to the arguments raised in [petitioner’s] reply” are permitted under the Board’s rules. *See Chamberlain*, 944 F.3d at 924-925; *see also id.* at 925 (“We understand the reference to ‘arguments’ [in the Board’s rules] to refer to new *issues*.”). While the Board’s ultimate judgment of obviousness should be reversed due to lack of substantial evidence in support, as discussed in Sections I-II above, its procedural errors in failing to fully consider USAA’s sur-reply arguments counsel, at minimum, for vacatur and remand. *See Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1325 (Fed. Cir. 2017) (“[A]n agency’s refusal to consider evidence bearing on the issue before it is, by definition, arbitrary and capricious.”).

**A. The Board incorrectly rejected arguments regarding the lack of motivation to combine Garcia with Byrne.**

The Board ruled that USAA’s argument “that an ordinary artisan would have instead been motivated to implement Garcia by using the mobile phone’s pre-installed web browser and camera software” was forfeit because it “was not raised in Patent Owner’s Response and is not fairly responsive to Petitioner’s Reply.” Appx78. The Board was mistaken. This argument was raised precisely and repeatedly throughout the Patent Owner’s Response. USAA explained “that the features Garcia is describing reflect a common internet browser application available on mobile phones in 2006” and that Garcia was a “self-contained” system that envisioned being run on a browser application. Appx505-506. USAA’s position was unwavering. *See, e.g.*, Appx539 (explaining that Garcia’s user would “open a session [on a web browser] with the banking institution during which check images and manually-entered data are transmitted to the institution’s servers,” explaining that “no other hardware or software [wa]s required (on the user’s end) to accomplish a remote check deposit,” and observing that “Petitioner does not identify any flaw or inefficiency with Garcia’s [browser-based] approach”).

Since “Petitioner chose [instead] to argue that a POSA would have ‘implement[ed] Garcia’s computer application using Byrne’s thin-client,’” USAA argued in the Patent Owner Response that “Petitioner was required to actually support these assertions with evidence to explain why a POSA would have been

motivated to create the proposed combination, rather than simply utilizing the existing Garcia system.” Appx527. On that front, as USAA explained, PNC failed. PNC offered no evidence “of a predictable improvement motivating a POSA to add Byrne’s functionality into Garcia’s existing system.” Appx537. As explained in the Patent Owner Response, PNC’s Dr. Mowry “conceded that there was no evidence that Byrne’s thin client system would increase efficiency” over Garcia’s browser-based system, and he admitted that the thin-client approach “may not be more efficient” “than what currently exists in Garcia,” which (in contrast to Byrne) “does not require downloading any software.” Appx537-538. Because a thin client approach requires “repeatedly download[ing] the ‘plug-in’ software,” which eats into bandwidth, USAA argued that Dr. Mowry’s “failure to address” this inefficiency *relative to a web application* was “inexplicable given that his stated motivation for a POSA combining Garcia and Byrne in the first place” was based on efficiencies. Appx539-540.

USAA’s Patent Owner Response further explained that, in light of “the difficulty of implementing—and cost of repeatedly downloading—a thin client plugin to control the capture process,” and especially given “the existence of an alternative approach (Garcia’s) requiring only the built-in web browser of a mobile telephone to enter data and upload[] images,” the evidence showed that “a POSA would not have been motivated to implement Byrne’s thin client plugin into Garcia’s

system.” Appx540-541.

USAA’s sur-reply developed this argument further in response to arguments presented in Petitioner’s Reply, Dr. Mowry’s reply declaration, and Dr. Mowry’s second deposition on that reply declaration. *See* Appx599-600 (PNC citing Dr. Mowry’s reply declaration for the proposition that the proposed combination of Garcia and Byrne would produce benefits of “memory savings, enhanced security, and improved software maintenance” arguments); Appx3692 (reply declaration); Appx6184 (second deposition). USAA was entitled to respond to and use this new evidence; indeed, it is the only “new evidence” that is expressly permitted in connection with a sur-reply under the Board’s rules. *See* 37 CFR § 42.23(b) (permitting sur-reply to “respond to arguments raised in the corresponding reply” and to be “accompanied by . . . deposition transcripts of the cross-examination of any reply witness”).

As explained in USAA’s sur-reply brief, all of the benefits asserted in PNC’s newly-submitted reply declaration to be the “strongest reasons to combine Garcia and Byrne” would be achieved by Garcia alone, without incurring the additional drawbacks of Byrne’s features. *See* Appx659. In doing so, USAA pointed to the same argument and supporting evidence it had introduced in the Patent Owner Response, e.g., Dr. Creusere’s declaration explaining how Garcia’s method “avoids all of these concerns [created by Byrne] by simply utilizing the pre-existing software

on the mobile phone to take photos and access a website to upload information for deposit.” *See* Appx658-659 (citing Appx5903-5904(¶30)). It further supported that argument with the new deposition testimony provided by PNC’s expert in reply, e.g., admitting that the supposed “benefits” of Byrne’s “thin client” are not actually benefits when compared to a system like Garcia that is implemented via a web page. *See* Appx660 (citing Appx6212-6213(29:19-30:6), Appx6216(33:7-12)). Moreover, these sur-reply arguments were necessary to respond to a new argument introduced in PNC’s reply brief that Garcia’s method would “not function without Byrne’s technology”—contradicting the theory presented in the petition that Garcia was fully enabled but lacking certain implementation details. *See* Appx660 (citing Appx598). This is precisely what sur-reply briefs are for under the Board’s rules, and the Board here abused its discretion by curtailing USAA’s opportunity to respond to the petitioner’s arguments.

**B. The Board incorrectly rejected arguments regarding the lack of motivation to combine Garcia with Singfield.**

The Board similarly erred in concluding that USAA’s arguments regarding the problems with duplicate detection that would result from inaccuracies in positioning checks for imaging were “not presented in the Response and [] not fairly responsive to the Reply.” Appx93. Again, the Board was mistaken. In its Patent Owner Response, USAA argued expressly that “Singfield’s method of duplicate detection, which involves magnetic MICR reading and signature comparison, was

not feasible on a Garcia mobile camera phone.” Appx519. In support of this argument, USAA presented evidence from its expert declarant, Dr. Creusere, “explaining that duplicate detection using signature comparison was unfeasible for a POSA in 2006,” and USAA pointed out that neither the petition nor its expert identified any “teaching within Singfield or elsewhere in the prior art explaining how a POSA would implement this ‘image comparison’-based duplicate detection scheme.” *See* Appx553-554; Appx5911-5914(¶¶ 39-40).

In response, PNC’s expert submitted a new declaration purporting to identify evidence in the art of “suitable algorithms for determining whether two images contain an identical signature,” claiming that this rebutted Dr. Creusere’s opinions. Appx605-606; Appx3755-3756. USAA’s arguments in sur-reply were directly responsive to this reply argument, addressing the newly identified references (which did not, in fact, disclose “suitable algorithms for determining whether two images contain an identical signature”) and pointing to Dr. Creusere’s declaration, submitted with the Patent Owner Response, explaining why those references did not change the fact that duplicate detection using signature comparison was considered unfeasible by a POSA in 2006. *See* Appx672-673. The Patent Owner Response thus clearly joined the issue of whether signature-comparison for duplicate detection was feasible in view of the evidence of record, and USAA was within its rights to refer to that same evidence of record to respond to new evidence presented by PNC and

its expert in reply. *See Chamberlain*, 944 F.3d at 925 (holding that “[p]arties are not barred from elaborating on their arguments on issues previously raised” and “clarification of [patent owner’s] prior position in response to the arguments raised in [petitioner’s] reply” are permitted under the Board’s rules); *see also id.* at 925 (“We understand the reference to ‘arguments’ [in the Board’s rules] to refer to new *issues.*”).

### CONCLUSION

For these reasons, this Court should reverse, or at least vacate, the Board’s invalidation of claims 1 and 8-20 of the ’598 patent.

December 29, 2023

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### **CERTIFICATE OF COMPLIANCE**

This brief complies with the type-volume limitation of Federal Circuit Rule 32(b)(1). This brief contains 11,957 words, excluding the parts of the brief exempted by Federal Rule of Appellate Procedure 32(f) and Federal Circuit Rule 32(b)(2).

This brief complies with the typeface requirements of Federal Rule of Appellate Procedure 32(a)(5) and the type style requirements of Federal Rule of Appellate Procedure 32(a)(6). This brief has been prepared in a proportionally spaced typeface, 14-point Times New Roman font, using Microsoft Word for Office 365. As permitted by Fed. R. App. P. 32(g), the undersigned has relied upon the word count feature of this word processing system in preparing this certificate.

/s/ *Anthony Rowles*  
Anthony Rowles



# ADDENDUM

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<b>Paper / Exhibit No.</b>	<b>Document Description</b>	<b>Page</b>
Paper 47	Final Written Decision (May 10, 2023)	Appx49
Exhibit 1001	U.S. Patent No. 10,769,598 B1	Appx120

Trials@uspto.gov  
571-272-7822

Paper 47  
Date: May 10, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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PNC BANK N.A.,  
Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION,  
Patent Owner.

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IPR2022-00076  
Patent 10,769,598 B1

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Before MICHAEL R. ZECHER, TERRENCE W. McMILLIN, and  
JULIET MITCHELL DIRBA, *Administrative Patent Judges*.

DIRBA, *Administrative Patent Judge*.

JUDGMENT  
Final Written Decision  
Determining Some Challenged Claims Unpatentable  
*35 U.S.C. § 318(a)*

IPR2022-00076  
Patent 10,769,598 B1

On May 11, 2022, we instituted an *inter partes* review of claims 1–20 of U.S. Patent No. 10,769,598 B1 (Ex. 1001, “the ’598 patent”). Paper 20 (“Inst. Dec.”). Having considered the full record at trial, and for the reasons explained below, we determine that Petitioner has shown that claims 1 and 8–20 of the ’598 patent are unpatentable, but that Petitioner has not shown that claims 2–7 of the ’598 patent are unpatentable.

## I. BACKGROUND

### A. *History of this Proceeding*

On November 17, 2021, PNC Bank N.A. (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1–20 of the ’598 patent (Paper 3, “Pet.”), and Petitioner submitted a declaration from Dr. Todd Mowry in support (*see* Ex. 1002). During the preliminary proceeding, United Services Automobile Association (“Patent Owner”) filed a preliminary response (Paper 10), Petitioner filed a pre-institution reply (Paper 14), and Patent Owner filed a pre-institution sur-reply (Paper 18).<sup>1</sup> On that record, we determined that Petitioner had demonstrated a reasonable likelihood that it would prevail in establishing the unpatentability of at least one challenged claim, and we instituted an *inter partes* review of all challenged claims on all asserted grounds. Inst. Dec. 46–47.

During trial, Patent Owner filed a Response (Paper 26, “POResp.”), and in support, Patent Owner submitted testimony from Dr. Charles Creusere (*see* Ex. 2031). Petitioner then filed a Reply (Paper 33, “Pet. Reply”), which relied on an additional declaration from Dr. Mowry

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<sup>1</sup> Papers 9, 13, and 16 are the confidential, sealed versions of these three papers. *See* Inst. Dec. 2 n.1, 45–46.

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(*see* Ex. 1029). Finally, Patent Owner filed a Sur-reply (Paper 42, “PO Sur-reply”). In addition, Patent Owner twice deposed Dr. Mowry and filed the corresponding transcripts (*see* Ex. 2020; Ex. 2047), and Petitioner deposed Dr. Creusere and filed the corresponding transcript (*see* Ex. 1033).

An oral hearing in this proceeding was held on February 9, 2023, and a transcript of the hearing is included in the record. Paper 46 (“Tr.”).

### *B. Related Matters*

The parties indicate that Patent Owner asserted the ’598 patent against Petitioner in *United Services Automobile Association v. PNC Bank, N.A.*, 2:21-cv-00246 (E.D. Tex.) (“*PNC III*”). Pet. 2; Paper 6, 2. The parties identify two other district court litigations pending between the parties: *United Services Automobile Association v. PNC Bank N.A.*, Case No. 2:20-cv-00319 (E.D. Tex.) (“*PNC I*”) and *United Services Automobile Association v. PNC Bank N.A.*, Case No. 2:21-cv-00110 (E.D. Tex.), which was consolidated with *PNC I*. Pet. 2–3; Paper 6, 2–3 (Patent Owner’s Mandatory Notices).

The parties identify no other PTAB proceedings that challenge the ’598 patent, but identify the following proceedings that involve related patents:<sup>2</sup>

Challenged Patent	Case No.	Petitioner
US 10,013,605	CBM2019-00029	Wells Fargo Bank, N.A.
	IPR2020-01742	Mitek Systems, Inc.
	IPR2021-01399	PNC Bank N.A.

<sup>2</sup> The parties’ mandatory notices also identify thirteen other Board proceedings involving the parties that challenge unrelated patents, which we do not list here. *See* Pet. 2–3; Paper 6, 2–3.

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Challenged Patent	Case No.	Petitioner
US 10,402,638	IPR2020-01516	Wells Fargo Bank, N.A.
	IPR2022-00049	PNC Bank N.A.
	IPR2022-00050	PNC Bank N.A.

Of these, IPR2020-01516 was terminated during the preliminary proceeding, and the Board denied institution of the other five petitions.

### C. The Grounds

We instituted trial on the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–16, 18–20	103(a) <sup>3</sup>	Garcia <sup>4</sup> , Byrne <sup>5</sup> , Singfield <sup>6</sup>
17	103(a)	Garcia, Byrne, Singfield, Adusumilli <sup>7</sup>

See Pet. 7; Inst. Dec. 3.

<sup>3</sup> The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. § 103 effective March 16, 2013. The ’598 patent claims priority to an application filed before that date, so we refer to the pre-AIA version of § 103. *Accord* Pet. 5 & n.1. Our findings and analysis would be the same under the current version of the statute.

<sup>4</sup> WO 2005/043857 A1, published May 12, 2005 (Ex. 1003). Petitioner relies on a certified translation of this publication, which also appears in Exhibit 1003.

<sup>5</sup> US 2006/0249567 A1, filed Feb. 9, 2006, published Nov. 9, 2006 (Ex. 1004).

<sup>6</sup> US 2005/0097046 A1, published May 5, 2005 (Ex. 1005).

<sup>7</sup> US 2003/0097592 A1, published May 22, 2003 (Ex. 1007).

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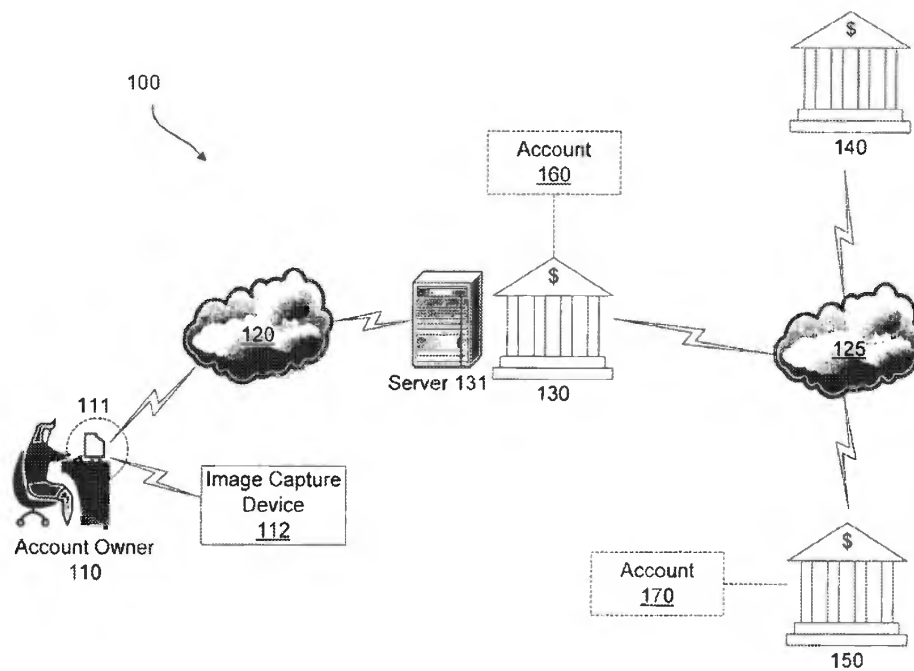
*D. Summary of the '598 patent*

The '598 patent is titled “Systems and Methods for Remote Deposit of Checks.” Ex. 1001, code (54). The application leading to this patent was filed on September 19, 2017, claiming priority via continuation applications to an application filed on October 31, 2006. *Id.* at codes (22), (63).

The '598 patent explains that there are advantages and disadvantages to using a check to purchase goods or services. *See* Ex. 1001, 1:30–2:20. One disadvantage is that “receiving a check may put certain burdens on the payee, such as the time and effort required to deposit the check,” because “depositing a check typically involves going to a local bank branch and physically presenting the check to a bank teller.” *Id.* at 2:10–15. To address this, the '598 patent provides a method “for remotely redeeming a negotiable instrument,” such as a check, using “a customer’s general purpose computer.” *Id.* at 2:41–44, 2:63–66.

Figure 1 (reproduced below) depicts a system in which the described method may be employed. Ex. 1001, 3:26–27, 3:66–67.

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**FIGURE 1**

Figure 1 (shown above) illustrates system 100, which includes: (a) general purpose computer 111 and image capture device 112 associated with account owner 110 (e.g., a bank customer at his private residence), and (b) several financial institutions 130, 140, and 150 (e.g., banks). *Id.* at Fig. 1, 3:65–4:5, 7:19–25. In operation, account owner 110 generates an image of a check with image capture device 112 and sends the image to financial institution 130 via general purpose computer 111. *Id.* at 4:6–10, 9:57–61. After receiving the check image, financial institution 130 processes the check image, communicates with other financial institutions (e.g., 140 and 150) to clear the check, and deposits the check value into owner 110's account 160. *Id.* at 9:64–10:2, 10:3–25.

Figure 5 (reproduced below) is a block diagram of components of financial institution electronics 500 (also referred to as “server 500”) and account owner's computer 530. Ex 1001, 10:36–44.



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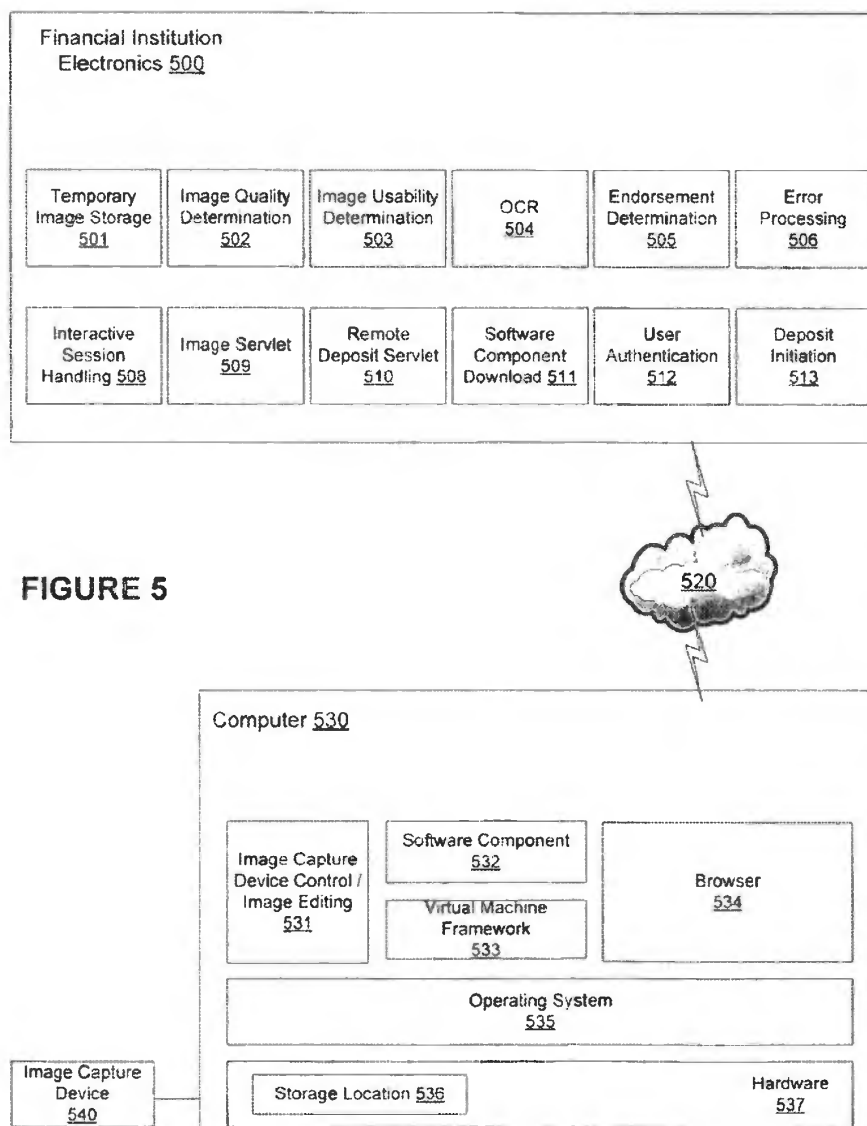


Figure 5 (shown above) is a block diagram illustrating the components of server 500 and computer 530. *Id.* at 3:39–43, 10:36–38. Server 500 provides a software component 532 to computer 530, which “allows the financial institution to control certain aspects of check image creation and delivery by the computer 530.” *Id.* at 10: 45–52. Server 500 also includes, among other things, a subsystem for user authentication 512, which may require a username and password from the user (*id.* at 10:58–60); remote

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deposit servlet 510 for receiving “an identification of an account for deposit of a check[] and an amount of said check” (*id.* at 11:1–5); image servlet 509 for receiving an image of the check from computer 530 (*id.* at 11:16–19); subsystems 502, 503 to analyze the check image for quality and usability (*id.* at 11:28–40); OCR 504 for performing optical character recognition (*id.* at 11:55–57); subsystem 505 to verify that the check is endorsed (*id.* at 12:42–44); and error processing 506 to check for errors, determine if a check was previously deposited, and compare an OCR amount with the amount provided by the customer (*id.* at 12:1–8, 12:18–21).

#### *E. Challenged Claims*

Petitioner challenges all 20 claims of the '598 patent. Of these, claims 1, 10, and 15 are independent. Claim 1 is illustrative and recites:

1. [p] A method of facilitating remotely depositing funds into a user's account with a bank's computing system and without using an Automatic Teller Machine (ATM), comprising:

[a] providing a remote deposit application for download to a customer device, wherein the remote deposit application comprises computer-executable instructions that, when executed by a processor, provide a user-interface and control a camera associated with the customer device to facilitate capturing at least one electronic image of a check;

[b] receiving at the bank's computing system, via the user-interface on the customer device: authentication data, an electronic identification of an account for receipt of a value associated with the check, an electronic indication of the value associated with the check, and the at least one electronic image of the check;

[c] determining whether the check was previously deposited using the at least one electronic image of the check; and

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[d] initiating and/or logging a first deposit of the value to the account via the bank's computing system unless the bank's computing system determines from the at least one electronic image of the check that the check was previously deposited.

Ex. 1001, 15:39–62 (reference letters added).

## II. ANALYSIS

### A. *Legal Standards*

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are “such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The legal question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of obviousness or nonobviousness.<sup>8</sup> *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966). One seeking to establish obviousness based on more than one reference also must articulate sufficient reasoning with rational underpinnings to combine teachings. *See KSR*, 550 U.S. at 418.

In an *inter partes* review, the petitioner has the burden of proving unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e). The burden of persuasion does not shift to the patentee. *Dynamic*

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<sup>8</sup> The record does not include allegations or evidence of objective indicia of nonobviousness. *See* Tr. 46:21–47:1.

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*Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

We implement procedures to facilitate a just, speedy, and inexpensive resolution of the proceeding (*see* 37 C.F.R. § 42.1(b)), and to that end, we place limitations on the contents of reply and sur-reply briefs and the parties' oral hearing presentations. Any arguments presented in the Reply or Sur-reply that are not fairly responsive to arguments raised in the preceding merits brief are untimely and forfeited. *See id.* § 42.23(b) (limiting scope of replies and sur-replies); Trial Practice Guide<sup>9</sup> 73–74 (explaining that “replies and sur-replies can help crystalize issues for decision” but cannot “proceed in a new direction with a new approach” or belatedly raise new issues or evidence); *see also* Trial Practice Guide 73 (explaining that a petitioner “may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a prima facie case of unpatentability”). Similarly, any arguments for patentability that Patent Owner did not raise in the Response are forfeited. *See* Paper 21 (Scheduling Order), 8 (cautioning Patent Owner that “any arguments not raised in the response may be deemed waived”);<sup>10</sup> Trial Practice Guide 52; *see also In re NuVasive, Inc.*, 842 F.3d 1376, 1380–82 (Fed. Cir. 2016) (holding that argument raised in the preliminary response but not raised in a patent owner response was waived). We limited the parties' oral hearing presentations to arguments made in their

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<sup>9</sup> PTAB Consolidated Trial Practice Guide (Nov. 2019), *available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

<sup>10</sup> *See In re Google Tech. Holdings LLC*, 980 F.3d 858, 862–63 & n.8 (Fed. Cir. 2020) (explaining that “forfeiture is the failure to make the timely assertion of a right” and noting that the court and parties have sometimes used the term “waiver” when applying the doctrine of forfeiture).

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briefs. Paper 39 (Order Setting Argument), 2–3; *see* Trial Practice Guide 85–86. Any new arguments raised at oral hearing are untimely and also forfeited. *See also Dell Inc. v. Acceleron, LLC*, 818 F.3d 1293, 1301 (Fed. Cir. 2016) (holding Board erred by relying on argument first presented at oral hearing).

*B. The Level of Ordinary Skill in the Art*

Our reviewing court has explained that “the level of skill in the art is a prism or lens through which a judge, jury, or the Board views the prior art and the claimed invention.” *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (citing *Al-Site Corp. v. VSI International, Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999)). “This reference point prevents these factfinders from using their own insight or, worse yet, hindsight, to gauge obviousness.” *Id.*

Petitioner asserts that the level of ordinary skill in the art corresponds to “a bachelor’s degree in electrical engineering, computer science, computer engineering, or equivalent field” and “two years of prior experience with image capturing/scanning technology, involving transferring and processing of image data to and at a server.” Pet. 14 (citing Ex. 1002 ¶ 45). Petitioner further asserts that “[l]ess work experience may be compensated by a higher level of education and vice versa.” *Id.* For purposes of the Institution Decision, we adopted Petitioner’s proposal (Inst. Dec. 16), and neither party alleges that a different level of ordinary skill should be applied in this proceeding (*see* PO Resp. 5; Pet. Reply).

In this Decision, we again adopt the level of ordinary skill proposed by Petitioner. We are satisfied that it generally comports with the level of

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skill necessary to understand and implement the teachings of the '598 patent and the asserted prior art. *Accord* Inst. Dec. 15–16.

### C. Claim Construction

We interpret claim terms using “the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). Under the principles set forth by our reviewing court, the “words of a claim ‘are generally given their ordinary and customary meaning,’” as would have been understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)).

In the Petition, Petitioner states that it is unnecessary to construe any claim terms or phrases (Pet. 12–14), but for two phrases in claim 1, Petitioner specifically argues that the prior art teaches or suggests the phrase under each of two alternate meanings (*id.* at 34–35, 37). In the Institution Decision, we agreed with Petitioner’s primary understanding of these phrases and, as a result, did not reach the alternative contentions. Inst. Dec. 33 n.18, 38 n.21.

At trial, Patent Owner states that claim construction is unnecessary to resolve the issues disputed in this proceeding. PO Resp. 6; Tr. 46:4–16. Petitioner agrees, but contends that Patent Owner’s arguments regarding dependent claim 3 are premised on a narrowing construction of one of its terms. Tr. 15:4–16:2. Patent Owner contends that the plain and ordinary meaning of the terms in that claim should apply. *Id.* at 46:12–16.

We agree that it is not necessary to expressly construe any claim terms or phrases in this proceeding. *See Nidec Motor Corp. v. Zhongshan Broad*

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*Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

*D. Summary of Asserted Prior Art*

*1. Garcia (Ex. 1003)*<sup>11</sup>

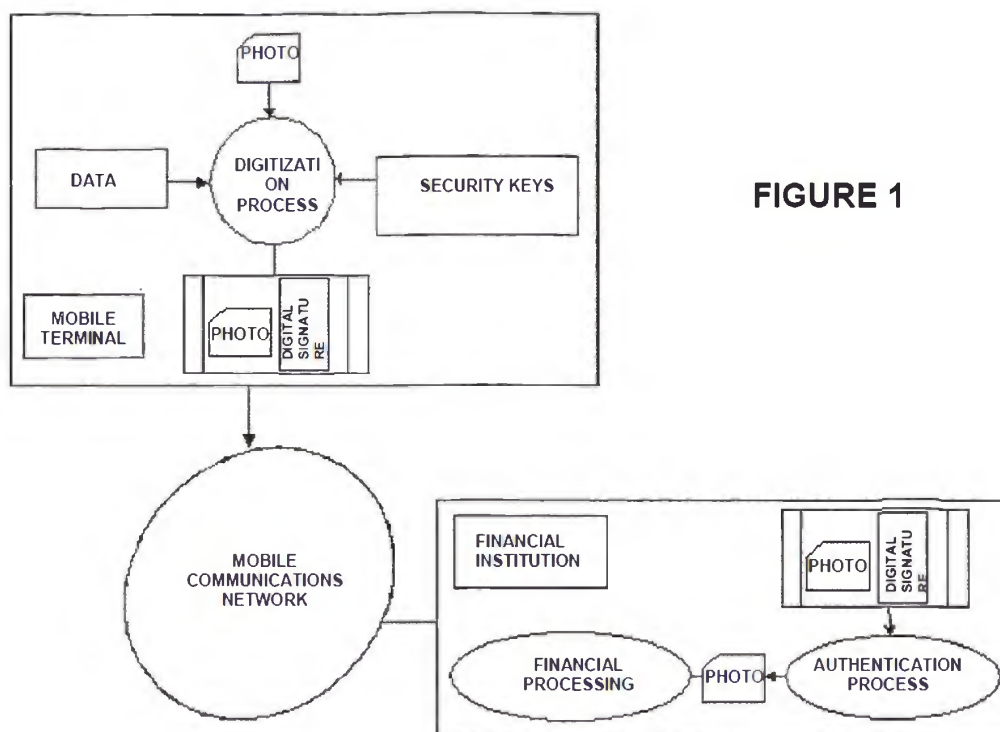
Garcia describes a method of transmitting a digital image of a check from a mobile device to a financial institution (such as a bank) for validation, processing, and storage. Ex. 1003, Abstr., 1:6–13, 4:1–18. In this way, a check can be “deposit[ed] into the existing account at a banking institution . . . by a user using a mobile device that incorporates a camera.” *Id.* at 4:14–16. According to Garcia, its “system achieves greater simplicity, speed, and security . . . in depositing checks[] by replacing the traditional check reader with a multi-purpose mobile device.” *Id.* at 7:18–22; *see id.* at 7:22–8:14 (further explaining these benefits).

Figure 1 (reproduced below) illustrates an example mobile device and financial institution that can use Garcia’s method. Ex. 1003, 9:11–18.

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<sup>11</sup> The English translation of Garcia begins on page 28 of Exhibit 1003. Unless otherwise noted, we follow the parties’ convention and cite to pages and lines within the English translation.

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**FIGURE 1**

Figure 1 (shown above) includes a mobile terminal and a financial institution that are connected via a mobile communications network.

In Garcia's method, a "user opens a computer application in the mobile telephone in which an interactive session is established with the receiving institution." Ex. 1003, 9:21–10:3; *see also id.* at 5:9–13. Then, the user enters "user recognition data, consisting of security keys for the user's identification and authentication . . . as well as data associated with the document itself, such as the amount." Ex. 1003, 5:14–20; *see also id.* at 10:4–9. The mobile device captures a digital image of the document and transmits both the digital image and the user recognition data to the institution. *Id.* at 5:21–6:5; *see also id.* at 10:10–18. The institution "[r]ecogniz[es], verif[ies], and electronically treat[s] and process[es] the information received" using computer equipment. *Id.* at 6:8–10, 11:7–19.



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Ultimately, the institution deposits the amount of the check into the user's account. *Id.* at 4:9–18.

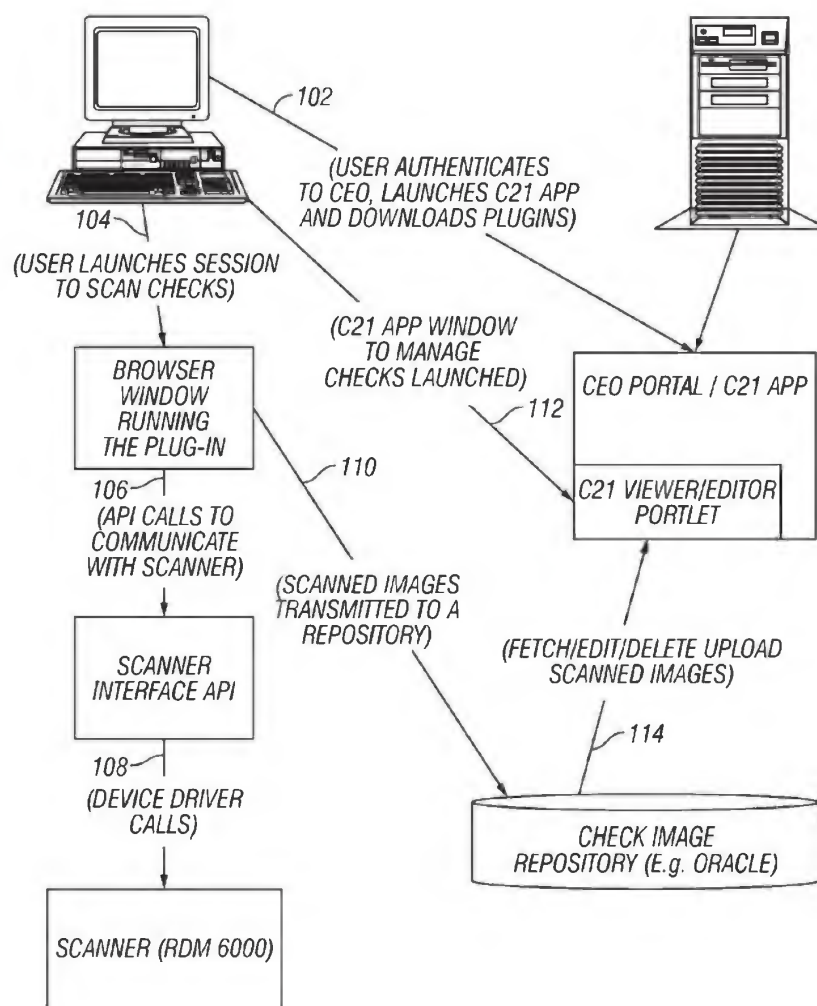
2. *Byrne (Ex. 1004)*

Byrne “provides a browser plug-in that allows a bank customer to scan checks using a personal computer and deposit the checks via the browser to a bank account.” Ex. 1004 ¶ 3; *see also id.* ¶ 42 (explaining that the description refers to a scanner but “the invention covers . . . any type of capturing device”).

According to Byrne, “[a]pplication software can be packaged in two basic forms,” which it refers to as a “fat application” (which “stays on [the] machine”) and a “thin client” (which is “downloaded with each invocation of the application software”). Ex. 1004 ¶¶ 45–46. Byrne prefers thin clients, which provide “security with ease and speed of software maintenance.” *Id.* ¶ 46; *see also id.* ¶ 45 (discussing the disadvantages of fat applications).

Figure 1 of Byrne is reproduced below.

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**FIG. 1**

Figure 1 of Byrne (shown above) is a flow diagram of Byrne's method of remotely depositing a check using a thin client application. Ex. 1004 ¶¶ 34, 47. In this method, a client personal computer (PC) authenticates with a desktop deposit application ("C21 App") (step 102). *Id.* ¶ 47. "After authentication, C21 App is launched and the appropriate desktop plug-in(s) is downloaded onto the client PC." *Id.* Then, "[t]he user launches a session for scanning checks from the browser window running the plug-in(s)" (step

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104). *Id.* ¶ 48. “Scanner interface APIs [application program interfaces] are called from the browser plug-in(s) for communicating with a scanning device that is communicably connected to the PC” (step 106), and “[t]he scanner APIs make device driver calls to the scanner” (step 108). *Id.* After a check is scanned, “the browser window running the plug-in(s)” transmits the images to C21 App (step 110), and C21 App allows the user to view and edit commands related to stored check images (step 112) and to perform functions such as fetch, edit and delete on the images (step 114).

### 3. *Singfield (Ex. 1005)*

Singfield describes “a method and apparatus for [w]irelessly depositing paper checks that are deposited from [a] home computer, desktop office computer, [or] mobile device that is Internet capable” using an “online account management system (OMS), which acts as a virtual teller.”

Ex. 1005 ¶ 4. In Singfield, an endorsed check is scanned, and the resulting image is transmitted to the OMS via a wireless network. *Id.* After receiving the check image, the OMS verifies the check data with the user. *Id.* ¶¶ 26, 29, 57; *see, e.g., id.* ¶ 26 (“[T]he check information is then verified by the user/depositor (check amount, check date, check routing number, checking account number, bank on check) . . .”). In addition, the OMS verifies “that [the] check hasn’t been cashed before continuing processing for check cashing . . . to prevent fraud and future attempts to cash the same check.”

Ex. 1005 ¶ 44; *see also id.* ¶ 24 & claim 20. “Once approved for deposit, the bank system records the check data received in the encrypted check image . . . to deposit the funds into the depositpr’s [sic] account,” and “the OMS virtually voids the check (through documenting the check data in the system) to prevent future deposits of the same check.” *Id.* ¶¶ 50, 57.

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4. *Adusumilli (Ex. 1007)*

Adusumilli relates to network security. Ex. 1007, Abstr. Adusumilli states that “[a]uthentication is a security function and process by which a system validates users and computers that interact with the system.” *Id.* ¶ 136. “One method for authenticating a device is through the use of digital certificates,” which “ensure the legitimate online transfer of confidential information, money or other sensitive materials by means of public encryption technology.” *Id.* ¶ 139.

E. *Obviousness Ground Based on Garcia, Byrne, and Singfield*

Petitioner contends that the subject matter of independent claims 1, 10, and 15 and dependent claims 2–9, 11–14, 16, and 18–20 would have been obvious over Garcia, Byrne, and Singfield. Pet. 18–72.

Patent Owner contends that a person of ordinary skill in the art would not have been motivated to combine the references as proposed to yield the invention recited in the independent claims. PO Resp. 6–62. In addition, Patent Owner separately addresses dependent claim 2 (*id.* at 62–63), dependent claim 3 (*id.* at 63–64), and dependent claim 7 (*id.* at 64–66).

1. *Independent Claim 1*

Petitioner relies upon Garcia as the base reference, arguing that it discloses a mobile device with a computer application that establishes an interactive session with a payee bank to deposit a check remotely. Pet. 19 (citing Ex. 1003, 9:19–10:18). According to Petitioner, Garcia does not provide some of the implementation details (*id.*), and a person of ordinary skill in the art would have been motivated to implement Garcia such that (1) Garcia’s application is implemented by a thin client application that is

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downloaded onto Garcia’s mobile device and provides a user-interface and controls a camera, as disclosed by Byrne, and (2) Garcia’s financial institution performs duplicate check detection, as disclosed by Singfield (*id.* at 28). *See also id.* at 18–28 (explaining rationale). Petitioner submits that the resulting combination of Garcia, Byrne, and Singfield teaches all the limitations of claim 1. *Id.* at 28–40.

Patent Owner disputes Petitioner’s arguments that an ordinary artisan would have modified Garcia in either of those two ways (PO Resp. 21–62), and Patent Owner also argues that an ordinary artisan would not have been motivated to combine Garcia, Byrne, and Singfield with a reasonable expectation of success to create a mobile phone-based remote deposit capture system (*id.* at 6–21). We address the former arguments in connection with the implicated claim limitations (i.e., elements 1[a] and 1[c]–1[d]), and we address the latter arguments in Section II.E.1.ii.

*i. Limitation-by-Limitation Analysis*

*1[p]: “A method of facilitating remotely depositing funds into a user’s account with a bank’s computing system and without using an Automatic Teller Machine (ATM)”*

Petitioner relies on Garcia for the preamble of claim 1. Pet. 28–31. According to Petitioner, Garcia’s mobile device captures a digital image of a check and transmits the image to a financial institution, and the financial institution deposits the check into the user’s account after processing it. *Id.* at 29–31 (citing Ex. 1003, Abstr., 1:7–13, 7:18–8:13, 9:9–10:18, 11:1–10, 11:12–15, 11:20–12:1, 12:20–22, Fig. 1).

Patent Owner does not dispute these contentions. *See* PO Resp.

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We find that Garcia teaches the preamble.<sup>12</sup> See Pet. 28–31. Garcia describes a method for remotely depositing a check by transmitting a check image from a user’s mobile device to a payee bank for automatic processing. E.g., Ex. 1003, Abstr., 1:5–13, 4:10–5:9, 9:19–10:18.

*1[a]: “providing a remote deposit application for download to a customer device, wherein the remote deposit application comprises computer-executable instructions that, when executed by a processor, provide a user-interface and control a camera associated with the customer device to facilitate capturing at least one electronic image of a check”*

For element 1[a], Petitioner relies on a combination of Garcia and Byrne. Pet. 31–32. Petitioner contends that Garcia discloses the claimed “remote deposit application” because Garcia expressly states that the “user opens a computer application in the mobile telephone” for establishing an interactive session with the financial institution. *Id.* at 31 (quoting Ex. 1003, 9:21–10:3; citing Ex. 1003, 4:14–16, 5:2–3; Ex. 1002 ¶ 87). Petitioner contends that Garcia also discloses “capturing at least one electronic image of a check,” as required by element 1[a], because Garcia’s “mobile device [] incorporates a digital camera [that is] able to take a digital photograph of one or both sides of said document.” *Id.* at 32 (quoting Ex. 1003, 12:7–9; citing Ex. 1003, 4:11–15, 5:21–22) (emphasis omitted; alterations Petitioner’s).

As for Byrne, Petitioner contends that Byrne teaches “providing a remote deposit application for download to a customer device,” as claimed, because Byrne’s “desktop deposit plug-in(s) is downloaded onto the client

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<sup>12</sup> We need not determine whether the preamble is limiting because Petitioner has sufficiently shown that Garcia discloses this aspect of the claim. See *Vivid Techs.*, 200 F.3d at 803.

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PC” to facilitate remote check deposit. Pet. 19–20, 31–32 (quoting Ex. 1004 ¶ 47; citing Ex. 1004 ¶¶ 3, 13, 46–48) (emphasis omitted). Petitioner also contends that Byrne’s downloaded plug-in provides a user-interface and controls the image capture device, as this limitation also requires. *Id.* at 20, 32 (citing Ex. 1004 ¶¶ 33, 41–42, 48, claim 1).

Petitioner further contends that a person of ordinary skill in the art would have been motivated to implement Garcia’s computer application using a downloaded thin client, such as Byrne’s plug-in. Pet. 20–25. According to Petitioner, Garcia does not expressly disclose implementation details (*id.* at 19), such as “how the handheld mobile device obtains the computer application” (*id.* at 20–21), but “a [person of ordinary skill in the art] would have readily understood that there were well-known ways of doing so in 2006, including, for example, as taught by Byrne” (*id.* at 21 (citing Ex. 1002 ¶ 64)). Petitioner further submits that, as shown by Byrne, a thin client implementation improves ease of software maintenance and support, and it also improves security. *Id.* (citing Ex. 1004 ¶¶ 46–47); *see also* Ex. 1002 ¶ 65.

Petitioner also contends that a person of ordinary skill in the art would have had a reasonable expectation of success in implementing this combination because: Garcia and Byrne are both directed to similar methods of remote check deposit; the ordinary artisan would have known that thin clients were suited for mobile devices; downloading software applications to a mobile device was “well-known”; and the ordinary artisan would have known that the distribution technique would not have affected the application’s operations and functionality. Pet. 22–24 (citing Ex. 1002 ¶¶ 68–72; Ex. 1003, 9:21–10:3, 10:10–18; Ex. 1004 ¶¶ 47–48, 174–175, 177–178); *see also id.* at 21–22 (citing Ex. 1002 ¶ 65). Petitioner further

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contends that the proposed combination applies a known technique to a known device to yield a predictable result (*id.* at 21–22 (citing Ex. 1002 ¶¶ 64–66)), and that the proposed combination would have been obvious to try because “[t]here were a finite number of identified, predictable solutions” (*id.* at 24–25 (citing Ex. 1002 ¶ 73; Ex. 1004 ¶ 45)).

Patent Owner disputes Petitioner’s arguments regarding the motivation to combine Garcia and Byrne to yield the subject matter of element 1[a]. PO Resp. 21–43. In particular, Patent Owner argues that an ordinary artisan would not have implemented Garcia’s application with Byrne’s thin client because mobile web browsers at the time were not capable of utilizing a downloadable plug-in. *Id.* at 23–26 (citing Ex. 2031 ¶¶ 33–36; Ex. 1004 ¶ 59; Ex. 2020, 231:22–232:3; Ex. 1018, 8). Patent Owner also argues that Petitioner fails to show that such a downloadable plug-in would have been able to provide a user interface and control a camera, as the claim requires. *Id.* at 26–31 (citing Ex. 2031 ¶¶ 34–36; Ex. 1004 ¶¶ 48, 102, 152; Ex. 2020, 29:24–30:4, 60:23–61:7, 159:7–22, 253:18–19; Ex. 2013, 1–2); *see also id.* at 33–34. In addition, Patent Owner argues that Byrne relies upon a specialized scanner, does not describe a mobile phone, and requires the user’s device to perform significant processing and repeatedly download the thin client software. *Id.* at 31–36 (citing Ex. 1004 ¶¶ 13, 48, 152, Fig. 6; Ex. 2046, 13; Ex. 2020, 249:12–24, 253:15–19), 38–43 (citing Ex. 1004 ¶¶ 46, 136, 148; Ex. 2020, 144:19–21, 147:20–148:1, 241:22–242:18, 245:2–21; Ex. 2031 ¶¶ 33–37, 41–44).<sup>13</sup>

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<sup>13</sup> Patent Owner also argues that Dr. Mowry abandoned his rationale for combining Garcia and Byrne (*see* PO Resp. 34, 36–38; *see also id.* at 42), but Patent Owner refers to reduction of bandwidth requirements, which is provided in connection with dependent claim 2 rather than claim 1 (*see*



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Having considered the parties’ arguments and evidence, we are persuaded that a person of ordinary skill in the art would have been motivated to combine Garcia and Byrne as proposed by Petitioner and that the resulting combination teaches element 1[a]. We begin by explaining why the combination teaches these claimed aspects, and then we explain why we are persuaded that an ordinary artisan would have been motivated to make this combination.

Garcia teaches or suggests most of the requirements of element 1[a]. In particular, Garcia discloses “a remote deposit application . . . [on] a customer device, wherein the remote deposit application comprises computer-executable instructions that, when executed by a processor,” perform certain steps, as claimed (*see* Ex. 1003, 9:19–10:3), and Garcia suggests that those steps include “provid[ing] a user-interface and control[ling] a camera associated with the customer device to facilitate capturing at least one electronic image of a check,” as claimed (*see id.* at 9:19–10:18). In particular, Garcia states that the “user opens a computer application in the mobile telephone in which an interactive session is established with the receiving institution” (i.e., the payee bank), and the mobile device “[c]aptur[es] the digital image” of the check and then “[t]ransmit[s] the digital image . . . to the [financial] institution.” *Id.* at 9:19–10:18. In addition, Garcia states that the mobile device “must allow” receipt of user input and capture and transmission of the check’s image. *See id.* at 9:19–10:18; *see also, e.g., id.* at 5:1–6:10. From this, we find that Garcia suggests that its application provides a user-interface and controls the

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Ex. 1002 ¶ 115; *cf. id.* ¶¶ 60–73). Accordingly, we discuss this aspect of Patent Owner’s argument in connection with claim 2. *See infra* § II.E.3.

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camera. *See also id.* at 5:1–6:20 (describing interactive session where mobile phone collects information and image), 7:15–17 (requiring “constant communication between the user and the financial institution . . . during the entire process”), 9:19–10:18 (describing order of steps). However, Garcia does not include an explicit teaching to that effect, and it does not teach or suggest that the remote deposit application is “provid[ed] . . . for download,” as element 1[a] also requires.

But Byrne teaches these elements. In particular, Byrne describes “providing a browser plug-in that allows a bank customer to scan checks using a personal computer and deposit the checks via the browser to a bank account.” Ex. 1004 ¶ 3. Byrne expressly states that this “desktop deposit plug-in(s) is downloaded onto the client PC” (*id.* ¶ 47), and Byrne’s “browser software plug-in [] provide[s] an interface between the user and an enterprise” and calls “APIs . . . for communicating with a scanning device that is communicably connected to the PC” (*id.* ¶¶ 41, 48; *see also id.* at claim 1, ¶ 42 (explaining that it discusses “a personal computer” and “a scanner,” but “the invention covers any thin client . . . and any type of capturing device”)). Thus, Byrne teaches “providing a remote deposit application for download to a customer device” that “provide[s] a user interface and control[s]” an image capture device, as element 1[a] requires.

We are persuaded that it would have been obvious to combine these aspects of Byrne with Garcia to yield the subject matter of element 1[a]. Garcia states that the mobile phone includes “a computer application,” but it does not specify the type of computer application or how the mobile device acquired it. *See* Ex. 1003, 9:19–10:3; *see also, e.g., id.* at 11:1–6. We agree with Petitioner (*see* Pet. 21) that an ordinary artisan would have been

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motivated to use techniques known in the art to supply these missing implementation details, such as those taught by Byrne.

In particular, we are persuaded that a person of ordinary skill in the art would have been motivated to implement Garcia’s application by downloading, onto the mobile device, a thin client application, as disclosed by Byrne. *See* Pet. 19–25. Byrne touts the benefits of downloading a thin client rather than storing an application on a user’s device (Ex. 1004 ¶¶ 45–46; *see also id.* ¶¶ 47–48), and Dr. Mowry testifies that an ordinary artisan would have understood downloading a thin client to be a well-known way of distributing software in the relevant time period and suited for mobile devices (Ex. 1002 ¶¶ 64–65, 70). In addition, Dr. Mowry testifies that a thin client improves security and ease of software maintenance. *Id.* ¶ 65 (citing Ex. 1004 ¶¶ 46–47); *see also* Ex. 1033, 140:11–141:2 (Dr. Creusere agreeing that thin clients “dramatically simplif[y]” software maintenance), 143:13–20 (agreeing that security is important for financial data); Ex. 1005 ¶¶ 20–21 (evidence that the general background knowledge in the art identifies security as a concern for remote check deposit).<sup>14</sup> In addition, we agree with Petitioner (*see* Pet. 21–22; Ex. 1002 ¶¶ 66, 72) that an ordinary artisan would have understood such an implementation to apply a known

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<sup>14</sup> Patent Owner’s argument that security and software maintenance would have instead weighed against the proposed combination (*see, e.g.*, PO Sur-reply 9–10) is untimely because it was not advanced in the Response and is not fairly responsive to the Reply. *See supra* § II.A; Pet. Reply 15–16 (noting that the Response had not addressed these issues). Moreover, even if this argument had been properly raised, it would not be persuasive because Patent Owner does not identify persuasive evidence to support its position. *See, e.g., Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017) (“Attorney argument is not evidence.”).

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technique (Byrne's downloading thin client software) to a known device (Garcia's mobile phone) with predictable results.

We are also persuaded that a person of ordinary skill in the art would have been motivated to implement Garcia's application such that the application provides a user-interface and controls the image capture device, as disclosed by Byrne. *See, e.g.*, Pet. 22–23. Garcia suggests that the application should perform these functions (*see* Ex. 1003, 5:1–6:10, 9:19–10:18), and we credit Dr. Mowry's testimony that an ordinary artisan would find this desirable (*see* Ex. 1002 ¶¶ 65, 67). Moreover, the references lend themselves to the combination because Garcia and Byrne both describe remotely depositing a check via the Internet using software on a user's device that opens an interactive session, and both perform substantially similar steps. *See* Pet. 22–23; Ex. 1003, 9:21–10:3, 10:10–18, 11:7–15; Ex. 1004 ¶¶ 41, 48, 174–175, 177–178. Finally, Dr. Mowry testifies that the ordinary artisan would have had a reasonable expectation of success in implementing the combination, and he provides supporting analysis and evidence. Ex. 1002 ¶¶ 68–72; *see also* Ex. 1029 ¶¶ 38–39. We credit this testimony from Dr. Mowry because it draws reasonable inferences and is supported by the cited evidence.

Patent Owner argues that the differences between a desktop PC-based system (as used by Byrne) and mobile phone (as in Garcia) would have militated against the combination (PO Resp. 23–34), but we disagree. Specifically, Patent Owner focuses on the specific plug-in and APIs described in Byrne, arguing that these could not have been used in a mobile device (*see id.*; Ex. 2031 ¶¶ 35–36), but these arguments miss the mark. *See* Pet. Reply 11. Petitioner does not propose combining Garcia with Byrne's ActiveX control plug-in or scanner APIs specifically; rather, Petitioner

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contends that an ordinary artisan would have been motivated to implement Garcia with a downloadable thin client given Byrne’s disclosure of such software and its applicability in connection with remotely depositing a check (*see* Pet. 19–25). We agree that an ordinary artisan would have read Byrne as generally disclosing use of a thin client for remote check deposit (i.e., software downloaded to the user’s device when needed) (*see, e.g.,* Ex. 1004 ¶ 42), and Patent Owner’s arguments improperly assume that an ordinary artisan would have needed to bodily incorporate Byrne’s specific PC-based solution into Garcia’s mobile device. *See MCM Portfolio LLC v. Hewlett-Packard Co.*, 812 F.3d 1284, 1294 (Fed. Cir. 2015) (“[T]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference . . . .” (quoting *In re Keller*, 642 F.2d 413, 425 (CCPA 1981)). Relatedly, Patent Owner’s arguments regarding Byrne’s scanners (*see* PO Resp. 31–34) are unavailing because Petitioner relies upon Garcia’s camera—not Byrne’s scanner—to teach the claimed “camera” (*see* Pet. 32).

To the extent Patent Owner relies on these differences to contend that an ordinary artisan would not have had a reasonable expectation of success (*see* PO Resp. 23–34),<sup>15</sup> these arguments are unavailing. We are persuaded

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<sup>15</sup> Patent Owner neither clearly makes nor sufficiently explains such a contention. Petitioner submits that any such argument would be in conflict with the scope of the disclosure provided by the Specification of the ’598 patent (*see* Pet. Reply 9–10), and Patent Owner does not substantively respond (*see* PO Sur-reply 15). At the oral hearing, Patent Owner appeared to agree that an ordinary artisan *would* have been able to create a downloadable software application that controlled a mobile device camera so long as the software’s operation was specified. *See* Tr. 22:14–23; *see also id.* at 27:7–14 (clarifying that Patent Owner decided to focus its Sur-

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that an ordinary artisan would have been able to download a thin client onto a mobile device. *See* Ex. 1002 ¶¶ 65, 70 (Dr. Mowry testifying that thin clients were known to be suited for and compatible with mobile devices and citing Exhibits 1017–1019 in support); Ex. 1029 ¶¶ 27–28 (Dr. Mowry explaining that an ordinary artisan could have written software to be downloaded to a mobile device as a thin client); *see also* Pet. Reply 10–11. Also, we find that an ordinary artisan would have expected that the downloaded thin client could both control a mobile device’s camera and provide a user interface. *See* Ex. 1029 ¶¶ 27–29; *see also* Pet. Reply 11–13; Ex. 1033, 120:17–21 (Dr. Creusere agreeing that some mobile devices provided APIs), 125:12–126:1 (Dr. Creusere agreeing that Nokia used Symbian operating system); Ex. 1047, 1 (providing instructions for using camera API in Symbian developer library). Although Patent Owner argues that some of Dr. Mowry’s evidence “teaches the opposite” of what he claims (*see* PO Resp. 26 (citing Ex. 2031 ¶¶ 35–36)), we find that Dr. Mowry’s evidence supports his testimony. *See* Ex. 1029 ¶¶ 38–39 (Dr. Mowry responding to Dr. Creusere’s critiques of Exhibit 1018); Ex. 1033, 167:12–171:17 (Dr. Creusere providing substantially the same understanding of the discussed portions of the exhibit); *see also* Pet. Reply 17–18. Ultimately, we assign more weight to Dr. Mowry’s testimony on these points because it is supported by documentary evidence and analysis. In contrast, Dr. Creusere’s testimony is at least partially premised on the erroneous assumption that Byrne’s plug-in would be bodily incorporated into Garcia. *See* Ex. 2031 ¶¶ 35–36.

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reply on motivation to combine rather than reasonable expectation of success).

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As for Patent Owner’s arguments regarding the processing and bandwidth required to repeatedly download a thin client (*see* PO Resp. 34–42), we do not agree that the Petition fails to sufficiently address these factors in its discussion of independent claim 1. We disagree that Petitioner relied upon any of these factors to substantiate its rationale to combine for this claim (*see* PO Resp. 36–39, 42), and the mere existence of tradeoffs does not necessarily undercut a motivation to combine. *Cf. Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 795 (Fed. Circ. 2021) (stating that “simultaneous advantages and disadvantages do not necessarily obviate motivation to combine” (cleaned up)); *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) (The “case law does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention.”). Moreover, on this record, we determine that the tradeoffs associated with Petitioner’s proposal would not have undermined an ordinary artisan’s motivation to implement Garcia’s application with a downloaded thin-client that controls the camera and provides a user interface, as disclosed by Byrne. *See* Pet. Reply 17–18 (noting that there is no evidence of teaching away). Although the thin client would need to be downloaded by the mobile device each time (*see* PO Resp. 39–40; Ex. 2031 ¶ 34), we are persuaded that this would have been a predictable and acceptable tradeoff given the benefits identified by Petitioner (e.g., security and ease of maintenance). *See* Ex. 1029 ¶ 37;<sup>16</sup> *cf.* PO Sur-reply 13

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<sup>16</sup> Petitioner introduced evidence in response to Patent Owner’s argument that an ordinary artisan would have been discouraged from making the proposed combination by tradeoffs identified by Patent Owner. As a result, the evidence is properly presented for this purpose.

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(identifying no contradictory evidence). Also, we do not agree with Patent Owner’s argument that additional processing by the mobile device would have discouraged the combination because we do not agree that there would have been a material increase in the mobile phone processing required by Petitioner’s proposed combination for this claim. *Cf.* Ex. 2031 ¶ 34 (Dr. Creusere simply testifying that Petitioner’s proposal “has a processing cost” and desktop PCs had more processing power than mobile phones). Patent Owner’s argument is at least partially premised on an erroneous assumption that the thin client would need to perform all operations associated with Byrne’s plug-in (*see* PO Resp. 34–36), but as noted above, Petitioner does not propose bodily incorporation of Byrne’s plug-in.

Finally, as explained below (*infra* § I.E.1.b), we disagree with Patent Owner’s arguments that (1) Garcia discloses that its application is a web browser, (2) the Petition contends that Garcia’s application is a web browser, and (3) Garcia includes all implementation details. *See* PO Resp. 40–41; PO Sur-reply 7–10.

To the degree Patent Owner argues that an ordinary artisan would have instead been motivated to implement Garcia by using the mobile phone’s pre-installed web browser and camera software (*see* PO Sur-reply 6–11), this is an untimely argument because it was not raised in Patent Owner’s Response and is not fairly responsive to Petitioner’s Reply. As a result, this argument is forfeit. *See supra* § II.A (addressing proper scope of Sur-reply).

But, even if this argument had been properly presented, it would not have been persuasive for two reasons. First, even if the individual steps identified by Garcia could have been performed by different applications (*cf.* Ex. 2031 ¶ 30; Ex. 2047, 38:25–39:17), Garcia indicates that its application



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performs all steps (*see* Ex. 1003, 9:19–10:18). *Accord* Inst. Dec. 30. However, in the relevant time period, mobile phones did not have pre-installed software that could perform all steps, as a web browser could not capture images. *See* Ex. 1029 ¶ 35 n.10. Second, and more fundamentally, we evaluate whether Petitioner’s proposal would have been obvious, not whether it would have been the “most” obvious implementation of Garcia. *See Dome Patent L.P. v. Lee*, 799 F.3d 1372, 1381 (Fed. Cir. 2015) (“[J]ust because ‘better alternatives’ may exist in the prior art ‘does not mean that an inferior combination is inapt for obviousness purposes.’” (quoting *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012))); *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1197–98 (Fed. Cir. 2014) (stating that “the motivation [need not] be the best option, only that it be a suitable option from which the prior art did not teach away”); *see also In re Fulton*, 391 F.3d at 1200 (The “case law does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention.”).

*1[b]: “receiving at the bank’s computing system, via the user-interface on the customer device: authentication data, an electronic identification of an account for receipt of a value associated with the check, an electronic indication of the value associated with the check, and the at least one electronic image of the check”*

For element 1[b], Petitioner relies on the Garcia-Byrne combination. Pet. 33–36. Petitioner contends that Garcia teaches that the financial institution receives information from the mobile device, including the user’s security keys, a user-entered check amount, and a digital image of the check. *Id.* (citing Ex. 1003, 5:4–6:5, 11:7–12, 11:15–17, 12:4–22). From this,

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Petitioner asserts that Garcia teaches “receiving at the bank’s computing system . . . authentication data, . . . an electronic indication of the value associated with the check,<sup>[17]</sup> and the at least one electronic image of the check,” as required by this limitation. *See id.*

Petitioner contends that Byrne teaches the remaining requirements of this limitation. Pet. 33–34. Specifically, according to Petitioner, Byrne’s plug-in “provide[s] an interface between the user and an enterprise,” as explained above. *Id.* at 33 (quoting Ex. 1004 ¶ 41; citing Pet. 19–25). Petitioner also contends that Byrne discloses the claimed “identification of an account” because Byrne’s user selects an account for deposit and the client prepares an HTTP POST that includes an identification of the account. *Id.* at 34 (citing Ex. 1004 ¶¶ 173, 174,<sup>18</sup> 176, 184; Ex. 1002 ¶ 96). Petitioner asserts that an ordinary artisan would have been motivated to incorporate this feature of Byrne into Garcia. *Id.* (citing Pet. 19–25).

Patent Owner does not dispute these contentions. *See* PO Resp.

We find that the Garcia-Byrne combination teaches element 1[b]. *See* Pet. 33–34. Garcia’s user enters a username and password, captures a digital image of the check, enters the check amount, and may enter other data associated with the check (such as the check number). Ex. 1003, 5:14–22; *see also id.* at 10:4–13, 12:4–13. Then, Garcia’s mobile device transmits the

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<sup>17</sup> Petitioner contends that an ordinary artisan would have understood “receiving . . . an electronic indication of the value associated with the check” to mean “receiving an indication of the check amount distinct from the amounts visible in the check image.” Pet. 34. Because we agree that Petitioner’s interpretation falls within the scope of this limitation, we do not reach Petitioner’s alternative theory. *Accord* Inst. Dec. 33 n.18.

<sup>18</sup> The Petition cites paragraph 74, but quotes from paragraph 174. *See* Pet. 34. We have corrected this apparent typographical error.

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image and the manually-entered data to a payee bank (*id.* at 6:3–5), and the payee bank “recogniz[es], verif[ies],” and “process[es] the information” in order to “automatically process the deposit of the check in question into the service user’s account” (*id.* at 11:7–10, 12:13–22). As discussed above in connection with element 1[a], we are persuaded that an ordinary artisan would have been motivated to combine Garcia and Byrne such that Garcia’s mobile device includes a user-interface for communicating with the payee bank. *See also, e.g.*, Ex. 1004 ¶ 41. In addition, we are persuaded that an ordinary artisan would have been motivated to implement the Garcia-Byrne combination such that the information sent from the mobile device to the payee bank via the user interface identifies the user’s account. *See id.* ¶¶ 173, 176, 184; *see also* Ex. 1003, 12:13–22 (stating that Garcia’s system deposits the check into the user’s account).

*1[c]: “determining whether the check was previously deposited using the at least one electronic image of the check”*

Petitioner relies on Singfield for element 1[c]. Pet. 36 (citing Ex. 1002 ¶ 99). Petitioner quotes Singfield, which describes “‘a preinstalled tracking system . . . to prevent’ ‘[m]ultiple deposit (i.e., fraudulent activity) of the same check’ by ‘monitor[ing], and log[ging] **every check image received**’ and ‘**recogniz[ing] similar deposit requests.**’” *Id.* (quoting Ex. 1005 ¶ 24) (alterations and emphasis Petitioner’s). Petitioner also quotes Singfield’s statement that a “computer program . . . **verifies** the check information (check number, check amount, routing and account number, signature) does not exactly match any previous deposits linked to the user’s account.” *Id.* (quoting Ex. 1004, claim 20; citing Ex. 1004 ¶¶ 44, 50, claim 14) (alterations and emphasis Petitioner’s). Petitioner further contends that

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“it would have been obvious to use Singfield’s method for duplicate check detection in Garcia/Byrne’s method for remote check deposit.” *Id.*; *see also id.* at 25–28 (articulating rationale to combine Singfield with Garcia and Byrne).<sup>19</sup>

Patent Owner argues that Singfield does not disclose using a check image for duplicate detection, but instead uses the MICR<sup>20</sup> line information read by a specialized magnetic reader. PO Resp. 44–45 (citing Ex. 1005 ¶¶ 24, 48, claim 20; Ex. 2020, 94:8–12, 95:10–12, 102:12–18; Ex. 2027, 13; Ex. 2028, 16), 48–50 (citing Ex. 1005, claims 2, 20; Ex. 2020, 119:12–18, 120:12–17, 133:5–12). In support, Patent Owner also argues (1) Dr. Mowry could not identify any reference that showed the successful extraction of MICR information from an image captured by a mobile consumer device, (2) Singfield does not state how its OMS performs duplicate check detection, (3) all embodiments of Singfield require a magnetic reader for the MICR line, and (4) Singfield discusses reading the MICR line magnetically. *Id.* at 45–48 (citing Ex. 2020, 37:2–14, 94:8–12, 108:8–10, 133:5–12; Ex. 1005 ¶¶ 24, 48, claim 20). Patent Owner also submits that Singfield discloses obtaining check information from other sources, such as via manual input by a user or teller. *Id.* at 49–51 (citing Ex. 1005 ¶¶ 4, 50, claim 20; Ex. 2020, 111:12–15, 111:25–112:6, 118:5–10, 119:12–18, 120:12–17). Patent Owner also contends that Singfield’s statements that a

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<sup>19</sup> We address the rationale to combine Singfield with Garcia and Byrne in connection with element 1[d].

<sup>20</sup> MICR is an acronym for magnetic ink character recognition. *See* Ex. 1002 ¶ 35. Typically, a MICR line (found at the bottom of a check) includes a string of numbers that identify the bank’s routing number, customer’s account number, and check number. *Id.*

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user “verif[ies]” information does not mean that the information was not first manually entered by the user and submits that Singfield makes no mention of optical character recognition. *Id.* at 51–53 (citing Inst. Dec. 36; Ex. 1005 ¶¶ 4, 23, 26). Finally, Patent Owner addresses the disclosure in paragraph 24 and claim 20 of Singfield. *Id.* at 53–56 (citing Inst. Dec. 36; Ex. 1005 ¶¶ 24, 57, claim 20; Ex. 2031 ¶¶ 38–40; Ex. 2020, 113:8–12, 122:6–123:5).

Having considered the parties’ arguments and evidence, we are persuaded that a person of ordinary skill in the art would have understood Singfield to disclose element 1[c]. Singfield’s OMS determines whether a check was previously deposited. Ex. 1005 ¶¶ 24, 44, claim 20. For example, Singfield “verif[ies] . . . that [the] check hasn’t been cashed before continuing processing for check cashing . . . to prevent fraud and future attempts to cash the same check/multiple checks.” *Id.* ¶ 44.

In addition, Singfield discloses using *the check image* for duplicate detection. *See* Ex. 1005 ¶ 24, claim 20. Singfield claims:

A computer program of claim 2 further comprising of an ability that prevents duplicate deposits . . . through a preauthorization that verifies the check information (check number, check amount, routing and account number, signature) does not exactly match any previous deposits linked to the user’s account . . . .

*Id.* at claim 20. In short, Singfield’s “computer program” determines whether a check was previously deposited using “the check information,” which includes the “signature” (*id.*), and thus, an ordinary artisan would have understood that the computer program uses the check image for at least this purpose. *See* Ex. 1029 ¶ 43 (*cited in* Pet. Reply 20); *accord* Inst. Dec. 36.

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Patent Owner argues that Singfield’s claim does not disclose use of the check image by the bank’s computing system because Singfield “gives the option of a live teller” for certain aspects of its method. PO Resp. 54; *see* PO Sur-reply 20–22. We disagree. An ordinary artisan would have understood these operations to be performed by the recited “computer program.” *See* Ex. 1005, claim 20. Further, to the degree Patent Owner argues that an ordinary artisan would have had a different understanding of this passage because it was infeasible to compare signatures (*see* PO Resp. 54–56), we disagree for three reasons. First, such an argument is premised on the unfounded assumptions that the signatures of all check images would be compared (presumably because it would be the only piece of information used). *See id.* However, Singfield also uses other check information in its duplicate detection, and we perceive no reason why it would need to compare the signatures of each check in the database. *See* Ex. 1005, claim 20. Second, the cited evidence indicates that signature comparison was, in fact, feasible. *See* Ex. 1029 ¶¶ 46–47; Ex. 2020, 122:6–123:5 (Dr. Mowry testifying that signature comparison could happen in “a number of ways”); *cf.* Ex. 2031 ¶¶ 39–40 (*cited by* PO Resp. 54–56).

Third, another passage in Singfield also indicates that check images are used for duplicate detection. In particular, Singfield also teaches use of check images for duplicate detection in paragraph 24:

2. Multiple deposit (ie. fraudulent activity) of the same check . . . should be an extremely difficult task or execution. The online account management system [OMS] will monitor, and log every check image received, requested for deposit, and transaction cleared for deposit. OMS will have a preinstalled tracking system, which will recognize similar deposit requests and transactions that are requested, to prevent fraud.

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Ex. 1005 ¶ 24. We find that the most natural reading of this paragraph is that Singfield uses the “monitor[ed] and log[ged]” check image for duplicate detection to prevent fraud. *See also id.* ¶ 25 (beginning next paragraph by noting that “[t]he data from the image received and transmitted requires a variety of specified details . . . to be recognized, confirmed, and verified”). Although Patent Owner argues that Singfield does not sufficiently explain the details of its duplicate detection (*see* PO Resp. 46, 53–56), Patent Owner fails to explain the import of those purportedly missing details.

Patent Owner’s other arguments are inapposite. *See* PO Resp. 44–53. Patent Owner argues (1) Singfield uses a magnetic reader to obtain the MICR information, and this information is required for duplicate detection (*id.* at 44–48) and (2) Singfield contemplates manual entry of check information by the user or the teller (*id.* at 49–52). But, there are two critical flaws in these arguments. First, even if Patent Owner were correct on all points, we would still find that Singfield discloses duplicate detection using the check image, for the reasons we have explained. *See* Ex. 1005 ¶ 24, claim 20. It does not matter whether Singfield *also* discloses the use of non-image information for detecting duplicates (such as information entered by a person or extracted from a magnetic read), and Patent Owner does not show that any of the other cited disclosures undermine our understanding of the salient portions of Singfield.

Second, these arguments fail to account for Petitioner’s proposed combination and attack the references individually. *See* Pet. Reply 19–20; *Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1050 (Fed. Cir. 2019) (arguments individually attacking the references in an obviousness combination are not persuasive) (citing *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (“Non-obviousness cannot be established by

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attacking references individually where the rejection is based upon the teachings of a combination of references.”)). Patent Owner does not dispute that Singfield discloses duplicate detection, instead arguing that it does not disclose use of the *check image* for that process (*see* PO Resp. 43–56), and the use of the check image is inherent in Petitioner’s proposed combination. In particular, in the proposed combination, Garcia’s mobile phone transmits the check image to the payee bank for verification and processing, Garcia uses the check image for that verification and processing, and duplicate detection is performed as part of that. *See infra* §§ II.E.1.i.1[d] (addressing combination of Garcia and Singfield), II.E.1.ii (finding that Garcia suggests extracting check information from the check image using its required OCR).

Anticipating this issue, Patent Owner argues that Petitioner must show that Singfield alone teaches element 1[c] because “Petitioner does not rely on Garcia or Byrne as supplying this claimed element either explicitly or inherently.” PO Resp. 43 (citing Ex. 2020, 262:25–263:7).<sup>21</sup> We disagree with Patent Owner’s assessment of the Petition. For element 1[c], the Petition begins with a contention that “Garcia/Byrne/Singfield teaches this limitation,” and then it cites to Singfield’s disclosure as well as the Petition’s discussion of the proposed combination. Pet. 36 (citing *id.* at 25–28). In addition, the Petition specifically proposes that Garcia’s payee bank performs Singfield’s duplicate check detection. *Id.* at 25–28. As a result, under Petitioner’s proposal, Garcia’s server receives the check image and performs duplicate detection (using Singfield’s method) based on that

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<sup>21</sup> Dr. Mowry’s testimony does not support Patent Owner’s assertion; instead, he simply testifies: “Garcia does not discuss duplicate detection. That is taught by Singfield.” Ex. 2020, 262:25–263:7.



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image. *See id.* However, even if we were to read the Petition as Patent Owner proposes, we would still find that Petitioner has shown that Singfield teaches element 1[c], as explained above, and that Petitioner has shown that it would have been obvious to combine Singfield’s duplicate check detection with Garcia and Byrne, as proposed, to yield the requirements of element 1[d] as explained further below.

*1[d]: “initiating and/or logging a first deposit of the value to the account via the bank’s computing system unless the bank’s computing system determines from the at least one electronic image of the check that the check was previously deposited”*

For element 1[d], Petitioner relies on Garcia and Singfield. Pet. 37–40. Petitioner points to Garcia for “initiating . . . a first deposit of the value to the account via the bank’s computing system”<sup>22</sup> because Garcia’s financial institution “automatically process[es] the deposit of the check in question into the service user’s account,” which entails initiating a deposit of the check’s value. *Id.* at 37 (emphasis omitted; second alteration Petitioner’s) (quoting Ex. 1003, 12:9–22; citing Ex. 1002 ¶ 102), 39 (citing Ex. 1003, 11:7–12; Ex. 1002 ¶ 106). Petitioner contends that Singfield teaches initiating the deposit “unless” the bank’s computing system determines that the check was previously deposited. *Id.* at 39–40 (citing

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<sup>22</sup> We do not address Petitioner’s alternative contention that Singfield teaches “logging” (Pet. 37–39) because we are persuaded by Petitioner’s contention that the phrase “initiating and/or logging” is satisfied by “initiating” (*see id.* at 37). *Cf. Brown v. 3M*, 265 F.3d 1349, 1351 (Fed. Cir. 2001) (“When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art.”); *accord* Inst. Dec. 38 n.21.

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Ex. 1005 ¶¶ 44, 50, claims 14 and 20). For example, “Singfield discloses that ‘before [the] entire transaction process begins’ and before ‘funds are verified for deposit,’ a ‘computer program’ ‘verifies that no like items have been deposited (i.e. check number, check amount, date, etc.).” *Id.* at 39 (quoting Ex. 1005, claim 20) (emphasis omitted; alterations Petitioner’s).

Petitioner further contends that it would have been obvious “to incorporate Singfield’s method and software for duplicate check detection in Garcia/Byrne’s method for remote check deposit.” Pet. 40 (citing *id.* at 25–28). Specifically, according to Petitioner, Garcia states that its financial institution verifies and validates check images, but Garcia fails to provide details of this operation. *Id.* at 25 (citing Ex. 1003, 1:7–8, 4:11–15,<sup>23</sup> 11:9–10). From this, Petitioner argues that, in order to implement Garcia, a person of ordinary skill in the art would have been motivated to incorporate Singfield’s “well-known validation technique.” *Id.* at 25–26 (citing Ex. 1002 ¶¶ 74–76); *see also id.* at 28 (citing Ex. 1002 ¶ 79). Petitioner asserts that Singfield’s teaching is “complementary,” “efficient,” and “would have reduced financial losses due to fraud.” *Id.* at 26–27 (citing Ex. 1005 ¶ 44; Ex. 1002 ¶ 76). Petitioner further asserts that the combination applies a known technique to a known system to yield predictable results. *Id.* at 28 (citing Ex. 1002 ¶ 79). Finally, Petitioner contends that a person of ordinary skill in the art would have had a reasonable expectation of success. *Id.* at 27–28 (citing Ex. 1002 ¶¶ 77–78; Ex. 1005 ¶ 4).

Patent Owner contends that Petitioner fails to show that an ordinary artisan would have been motivated to modify Garcia and Byrne with

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<sup>23</sup> The Petition cites to Garcia at page 1, lines 11–15, but the quoted text appears on page 4, lines 11–15. We have corrected this typographical error.

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Singfield with a reasonable expectation of success. PO Resp. 56–62. According to Patent Owner, Byrne teaches that the “turn-around time” for the server’s processing should be one second or less, this delay was “an important concern to a [person of ordinary skill in the art],” and the combination with Singfield “would make impossible the 1-second goal of Byrne for analyzing a check.” *Id.* at 56 (citing Ex. 1004, Fig. 6 (block 618)), 58 (citing Ex. 2031 ¶¶ 39–40). In addition, Patent Owner argues that Dr. Mowry “was unable to say whether it would still be possible to satisfy this 1-second turnaround time if duplicate [check] detection were added into the Garcia/Byrne system.” *Id.* at 56–57 (citing Ex. 2020, 122:20–123:5, 267:11–17, 268:3–16). Patent Owner also argues that Dr. Mowry does not sufficiently address “the alternative solution” of “requiring the customer to mail in the physical check to complete the deposit,” or whether an ordinary artisan would have been motivated to accept the increased processing burden required by the combination. *Id.* at 57–58 (citing Ex. 2023, 7; Ex. 2020, 177:4–22, 178:5–14). Patent Owner also contends that Singfield uses a scanner rather than a camera to obtain a check image (*id.* at 59–60), and as a result, an ordinary artisan would not expect the combination to be successful (*id.* at 60–62 (citing Ex. 2020, 87:2–11; Ex. 2024; Ex. 2031 ¶¶ 43, 46)).

Having considered the parties’ arguments and evidence, we are persuaded that an ordinary artisan would have been motivated to combine Singfield with Garcia and Byrne, as proposed, and that the combination discloses element 1[d].

Garcia teaches that its financial institution verifies and processes the check image and then deposits the check amount into the user’s account. *E.g.*, Ex. 1003, 11:7–19, 12:9–22. Singfield discloses “determining whether the check was previously deposited using the at least one electronic image of

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the check” (*see supra* § II.E.1.i.1[c]), and Singfield discloses that a deposit is initiated “unless” the software determines that the check was previously deposited (*e.g.*, Ex. 1005 ¶¶ 44, 50, claim 20).

We are persuaded that a person of ordinary skill in the art would have been motivated to perform Singfield’s duplicate check detection at Garcia’s financial institution, as proposed by Petitioner. Garcia indicates that the financial institution validates a check before deposit, but Garcia does not provide details of this operation. *E.g.*, Ex. 1003, 4:11–15, 11:7–19. Singfield describes a method of validating a check by verifying that it was not previously deposited (*e.g.*, Ex. 1005 ¶¶ 24, 44), and we are persuaded that a person of ordinary skill in the art would have been motivated to use Singfield’s duplicate check detection method to implement Garcia’s validation process. In particular, Dr. Mowry explains (and we agree) that an ordinary artisan would have been motivated to incorporate duplicate check detection to reduce financial losses due to fraud and would have been motivated to use Singfield’s approach because it was efficient. Ex. 1002 ¶ 76. Moreover, we are persuaded that the proposed combination would have merely been a combination of a known technique with a known system to yield predictable results. *See* Pet. 28. In addition, Dr. Mowry also testifies that an ordinary artisan would have had a reasonable expectation of success in making the proposed combination (Ex. 1002 ¶¶ 77–78), and we credit this testimony.

Patent Owner’s contrary arguments (*see* PO Resp. 56–62) are unavailing. Initially, we disagree with Patent Owner’s argument that the Petition is defective because it did not address the speed and processing power of the resulting system. *See id.* at 56–58. Once again, the mere existence of tradeoffs does not necessarily undercut a motivation to

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combine. *See Intel*, 21 F.4th at 795 (stating that “simultaneous advantages and disadvantages do not necessarily obviate motivation to combine” (cleaned up)). Moreover, Patent Owner’s argument that the Petition fails to address Garcia’s “alternative solution” (*see* PO Resp. 58) is inapposite. Garcia does not disclose an alternative solution in which a physical check is mailed (*see infra* § I.E.1.ii), and such a solution would have been contrary to Garcia’s disclosure. *See* Ex. 1003, 12:17–22 (stating that payee bank uses image and additional data to “automatically process the deposit of the check in question into the service user’s account”); *see also, e.g., id.* at 2:1–14 (identifying problem in the prior art’s requirement that the physical document be “present[ed] or sent” to the bank).

We have considered the speed tradeoff alleged by Patent Owner (*see* PO Resp. 56–58; PO Sur-reply 22–24), but we find that an ordinary artisan would have been motivated to make the proposed combination notwithstanding this consideration. Byrne indicates a preference for the server to perform its processing in one second (*see* Ex. 1004, Fig. 6, block 618), and an ordinary artisan would want the system to respond quickly (*e.g.,* Ex. 2020, 268:8–16); however, an ordinary artisan would have understood speed to be a well-known tradeoff for additional processing and would not have viewed a one-second turn-around time as a strict requirement. Also, we find that an ordinary artisan would have found the additional delay required to perform Singfield’s duplicate check detection to have been minor and justified in order to minimize losses due to fraud. Indeed, the evidence shows that performing a comparison of two signatures, for example, would take less than a second (*see* Ex. 1029 ¶¶ 46–47 (addressing image comparison)), and Patent Owner’s contrary argument appears to be premised on the misplaced assumption that the payee bank

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would need to compare the images of *all* checks (*see supra* § II.E.1.i.1[c] (addressing errors in this argument)).<sup>24</sup> In addition, as explained below (*infra* § II.E.1.ii), we are persuaded that Garcia suggests using OCR to extract MICR information from an image of the check, and in the proposed combination, minimal additional processing would have been required to compare the MICR information with past deposits to check for duplicates (as Singfield also discloses).

Patent Owner's argument that Petitioner fails to show that an ordinary artisan would have used a signature in a duplicate check detection process (PO Sur-reply 20, 22–23) is also unavailing. This argument again fails to account for Petitioner's proposed combination, in which Garcia's mobile phone transmits the check image to the payee bank for verification and processing, and that processing includes duplicate check detection using the check image. *See supra* § II.E.1.i.1[c]. But, even if we were to require Petitioner to show that Singfield alone discloses element 1[c], this argument would still be unavailing. Petitioner proposes a combination of Garcia and Byrne with Singfield's method, and Singfield teaches duplicate check detection that uses the signature, as discussed above. *See* Pet. 25–28. We are persuaded by Petitioner's arguments that an ordinary artisan would have incorporated Singfield's duplicate check detection (including its signature comparison) in Garcia's system.

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<sup>24</sup> Also, to the degree Patent Owner argues that there is no motivation to perform duplicate check detection in the user's mobile device (*see* PO Resp. 58 (citing Ex. 2031 ¶ 39); PO Sur-reply 24), this argument is inapposite because Petitioner proposes that the payee bank would perform the duplicate check detection.

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We further disagree with Patent Owner’s arguments (*see* PO Resp. 59–62) that the differences between a scanner and a camera would have discouraged the combination. For the reasons explained below (*infra* § II.E.1.ii), these arguments are fatally flawed because they fail to account for the disclosure of Garcia, which specifically teaches using a mobile phone to capture a check image for remote deposit. *E.g.*, Ex. 1003, 1:5–13, 4:10–5:9. In short, Garcia, by itself, is strong evidence that a person of ordinary skill in the art would have expected to be able to remotely deposit a check using a mobile phone. Also, we do not agree with Patent Owner’s assumption that an ordinary artisan, when looking to implement Garcia, would only have looked to references that used a mobile phone to remotely deposit a check.

Finally, in Sur-reply, Patent Owner introduces a new argument that a slight difference in the positioning of the check would shift the location of the signature, causing an image comparison to fail even if the signatures are duplicates. PO Sur-reply 23–24 (citing Ex. 2031 ¶ 42). This argument was not presented in the Response and is not fairly responsive to the Reply, so it is untimely and forfeit. *See supra* § II.A. Indeed, although Patent Owner tries to fault the Petitioner for not addressing paragraph 42 of Dr. Creusere’s declaration (PO Sur-reply 23), the Response itself does not address it (or even cite to it) (*see* PO Resp.). Petitioner need not respond to an argument that was never made.

*ii. Rationale to Combine*

Patent Owner contends that a person of ordinary skill in the art “would not have been motivated with a reasonable expectation of success to combine Garcia/Byrne/Singfield to create a mobile phone-based remote

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deposit capture system.” PO Resp. 6 (capitalization altered); *see also id.* at 6–21. In support, Patent Owner argues that Garcia teaches a complete and enabled system that uses “a common internet browser application,” and Patent Owner submits that Dr. Mowry’s testimony confirms this. *Id.* at 7–8 (citing Ex. 1003, Abstr., 5:1–5, 9:20–10:3; Ex. 2020, 19:15–20, 22:6–10, 23:3–11, 84:10–18, 85:1–6, 86:4–8; Ex. 2031 ¶ 31). Patent Owner also argues that Garcia requires the physical check to be sent to the payee bank, as was the state of the art at the time. *Id.* at 8–9 (citing Ex. 1003, 11:17–19;<sup>25</sup> Ex. 2031 ¶¶ 31–32; Ex. 2023, 7; Ex. 2038); *see also id.* at 18–19 (arguing that the testimony of other experts retained by Petitioner supports this understanding of Garcia (citing Ex. 2020, 275:5–10; Ex. 2026, 92:19–93:13)).

Patent Owner also argues that mobile check deposit was considered unworkable and non-obvious at the relevant time period because there were technological challenges associated with capturing a check image using a camera phone, rather than using a traditional check scanner. PO Resp. 9–17. In support, Patent Owner points to the testimony of Mr. David Peterson, Petitioner’s expert in *PNC III*, and Dr. Omid Kia, Petitioner’s expert in *PNC I*. *Id.* (citing Ex. 2025 ¶¶ 4–21; Ex. 2026, 42:6–19, 42:21–43:5, 43:9–44:2, 67:25–68:9, 69:1–18, 124:20–25; Ex. 2035, 2; Ex. 2036, 937:6–12, 938:10–939:18, 941:13–25, 943:4–7).<sup>26</sup> Patent Owner further argues that

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<sup>25</sup> We add this citation because Patent Owner quotes this portion of Garcia.

<sup>26</sup> In addition, Patent Owner states that Dr. Creusere explains why there would not have been a motivation to combine or a reasonable expectation of success, and that an inventor discussed the algorithms developed to address these problems. PO Resp. 17 (citing Ex. 2031 ¶¶ 43–46; Ex. 2045, 274:24–277:17). However, we do not address arguments made only in the exhibits. *See* 37 C.F.R. § 42.6(a)(3) (“Arguments must not be incorporated by



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Dr. Mowry fails to address the differences between camera phones (used by Garcia) and specialized scanners (used by Byrne and Singfield) and refused to address Mr. Peterson’s and Dr. Kia’s contrary testimony. *Id.* at 18–21 (citing Ex. 2020, 200:14–17, 208:20–25, 208:9–13; 216:2–5).

Having considered the parties’ arguments and evidence, we are persuaded by Petitioner’s contentions that it would have been obvious to combine Garcia, Byrne, and Singfield as proposed, notwithstanding Patent Owner’s arguments to the contrary.

Garcia describes a method for remotely depositing a check using a mobile device. *E.g.*, Ex. 1003, 1:5–13, 4:10–5:9. Garcia teaches that a user “opens a computer application in the mobile telephone,” which establishes an interactive session with the payee bank. *Id.* at 9:19–10:3. Then, using the mobile device, Garcia’s user enters a username and password, captures a digital image of the check, enters the check amount, and may enter other data associated with the check (such as the check number). *Id.* at 5:14–22, 10:4–13. The image and the manually-entered data are transmitted to a payee bank (*id.* at 6:3–5, 10:16–18), and the payee bank “recogniz[es], verif[ies],” and “process[es] the information” (*id.* at 6:8–10, 11:7–10).

Unsurprisingly, Garcia does not specify all of its implementation details. For example, Garcia states that the mobile phone includes “a computer application,” but does not specify the type of computer application, its functionality, or how the mobile device acquired it. *See* Ex. 1003, 9:19–10:3; *see also, e.g., id.* at 11:1–6. Also, Garcia does not explain in detail how the payee bank recognizes, verifies, and processes the

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reference from one document into another document.”); *see also* Trial Practice Guide 35–36.

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check deposit, but instead simply states that the payee bank has the “means” to do so, which “consist basically of computer equipment connected to the Internet that has an optical character recognition (OCR) system, a code authentication system and means of transmitting data to the institution’s document processing system.” *Id.* at 11:7–19.

We are persuaded that a person of ordinary skill in the art would have been motivated to use techniques that were known in the art, such as Byrne’s downloaded thin client and Singfield’s duplicate check detection, to supply the implementation details missing from Garcia. In particular, as explained in connection with element 1[a], we are persuaded that a person of ordinary skill in the art would have been motivated to implement Garcia’s application by downloading, onto the mobile device, a thin client application that provides a user-interface and controls the image capture device, as disclosed by Byrne. Also, as explained in connection with element 1[d], we are persuaded that a person of ordinary skill in the art would have been motivated to implement Garcia’s verification process using Singfield’s duplicate check detection.

Patent Owner’s arguments to the contrary are unavailing.

First, we disagree with Patent Owner’s argument that Garcia discloses using “a common internet browser” as the application. PO Resp. 6–8; *see also id.* at 40–41 (arguing that Garcia’s device was pre-installed with the application).<sup>27</sup> As an initial matter, neither the word “browser” or the term “Internet browser” appear in Garcia. *See* Ex. 1003. But, even if the

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<sup>27</sup> Patent Owner inaccurately states that “Petitioner characterizes [Garcia’s application] as an Internet browser.” PO Resp. 41 (citing Pet. 23); *see also id.* at 22. The Petition includes no such contention. *See* Pet. 21–23.

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functionality of Garcia’s disclosed application “*could* have been performed by a typical mobile web browser in 2006,” as Dr. Creusere testifies, there is insufficient support for his conclusion that an ordinary artisan would have understood the application “*to be* a web browser opening an HTTPS connection to the banking institution’s website.” Ex. 2031 ¶ 30 (emphasis added); *see also id.* ¶¶ 27–28 (providing additional context for quoted testimony). It appears that Dr. Creusere’s conclusion is premised on the erroneous assumption that a reference *discloses* use of a particular type of software so long as an ordinary artisan would have understood that type of software *could* have been used with the method described in the reference. As a result, Dr. Creusere’s conclusion is insufficiently supported, and we assign little weight to it. Moreover, despite Patent Owner’s assertion to the contrary (*see* PO Resp. 7–8), Dr. Mowry’s testimony also does not support its argument. *See* Ex. 2020, 19:15–20:14 (Dr. Mowry explaining that the question was unclear), 22:6–23:11 (testifying that a “computer application” is software and that a browser is software), 84:10–86:8 (explaining that the question was unclear and that Garcia is “self-contained” and enables remote deposit).

Second, we disagree with Patent Owner’s argument (*see* PO Resp. 8–9, 18–19; *see also id.* at 1–3, 58) that Garcia requires a physical check to be sent to the payee bank. Garcia teaches that its “system achieves greater simplicity, speed, and security . . . by replacing the traditional check reader with a multi-purpose mobile device.” Ex. 1003, 7:18–22. Moreover, Garcia explains that the user avoids unnecessary trips to a branch because the truncation process is performed external to the bank (*id.* at 7:22–8:11), and it states that the bank uses an image of a check and additional data to “automatically process the deposit of the check in question” (*id.* at 12:17–

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22). In addition, Garcia states that the payee bank must have “an optical character recognition (OCR) system.” *Id.* at 11:7–13. As a result, we find that an ordinarily skilled artisan would have understood Garcia to teach using a check’s image to remotely deposit the check. Also, given these disclosures, we find that Garcia’s reference to “the usual means (truncation systems)” (*id.* at 11:17–19) does *not* indicate that a bank receives the physical check and then truncates it.<sup>28</sup> Rather, we understand Garcia to use the words “usual means” to refer to a bank’s existing (or usual) check processing systems, i.e., the check processing used for other checks received by the bank. *See id.* at 11:7–19.

Patent Owner’s contrary evidence does not outweigh these statements in Garcia.<sup>29</sup> *See also* Ex. 1033, 54:16–55:11 (Dr. Creusere agreeing that Garcia does not describe mailing a physical check). Patent Owner relies on the fact that Garcia does not describe analyzing the quality of the check image or techniques to obtain an image of sufficient quality (*see* PO Resp. 3–4, 8, 18–19 (citing Ex. 2020, 275:5–10; Ex. 2026, 92:19–93:13)), but the absence of such implementation details does not change our understanding of Garcia. The evidence indicates that mobile phones were capable of capturing a sufficient check image at least some of the time. *See, e.g.*, Ex. 1031 ¶ 126; Ex. 2026, 68:15–18, 71:2–9; Ex 2036, 970:15–971:6.

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<sup>28</sup> Truncation refers to “taking the physical document out of the [processing] chain and replacing it with an electronic form.” Ex. 2022, 54:10–55:5.

<sup>29</sup> Patent Owner does not contend that Garcia’s disclosure is not enabled (*see* Tr. 46:17–20; PO Resp. 7), so we presume that it is. *See, e.g., Apple Inc. v. Corephotonics, Ltd.*, 861 F. App’x 443, 449 (Fed. Cir. 2021) (non-precedential) (“It is well-established that prior art patents and printed publications like Konno, a Japanese patent publication, are presumed enabling.”).

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Patent Owner also relies on the alleged commercial embodiment of Garcia and another company's check deposit system (PO Resp. 1–2, 8–9 (citing Ex. 2021, 13; Ex. 2023, 7; Ex. 2038; Ex. 2031 ¶¶ 31–32)), but neither is probative of the disclosure of Garcia (*see* Ex. 1003).

Relatedly, Patent Owner argues that Garcia “does not teach that the MICR information is obtained from the electronic image of the check” (PO Sur-reply 16), but this misses the mark. Garcia states that the bank must be able to perform an OCR on the check image for deposit (Ex. 1003, 11:7–15), and the most reasonable read of this disclosure is that it suggests optically extracting check information (such as information from the MICR line like the routing and account numbers) using OCR. Thus, even though Garcia does not *teach* obtaining this information from the check image, Garcia does *suggest* it. *See also, e.g., id.* at 7:18–8:8 (“This system achieves greater simplicity, speed, and security in the process of accepting bank documents and bills, and particularly in depositing checks, by replacing the traditional check reader with a multi-purpose mobile device.”).

According to Patent Owner, Garcia discloses entry of the MICR information because Garcia refers to manually inputting a “document number” (PO Resp. 2 (citing Ex. 1005, 5:15–20; Ex. 2031 ¶ 29)), but this argument also is unavailing. First, we disagree with Patent Owner's understanding of Garcia's “document number.” The cited testimony from Dr. Creusere is premised on an unfounded assumption that Garcia's “document number” must uniquely identify the check<sup>30</sup> (*see* Ex. 2031 ¶ 29),

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<sup>30</sup> We note that an ordinary artisan does not have any specialized knowledge of the banking industry (*see supra* § II.B), and a “document number” to an ordinary artisan would simply be a number that identifies a document.

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and we do not agree with his assumption. A MICR line includes a long string of numbers representing a bank’s routing number, a customer’s account number, and the check number. In our view, relying on the manual entry of this long string of numbers would be counterintuitive, as the inadvertent entry of the wrong numbers would seem to run an unacceptable risk of withdrawing from the wrong account. Second, even if Patent Owner’s understanding of this term were correct, Garcia makes clear that entry of the “document number” is optional. *See* Ex. 1003, 5:14–20 (noting user enters “data associated with the document itself, such as the amount *and/or* the document number” (emphasis added)). Garcia discloses that the payee bank must have OCR capability (*id.* at 11:7–15), which strongly suggests that the payee bank performs an OCR to obtain check information from the image. Patent Owner attempts to discount this disclosure by arguing that “there is nothing in Garcia indicating that it had the ability to successfully extract the information necessary for check deposit from the image” (PO Resp. 3), but we see no reason to require any additional disclosure from Garcia.

Third, we do not agree with Patent Owner’s arguments that rely on the testimony of Mr. Peterson and Dr. Kia (Petitioner’s experts in *PNC III* and *PNC I*, respectively). *See* PO Resp. 9–17; *see also* PO Sur-reply 1–3.<sup>31</sup>

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<sup>31</sup> In Sur-reply, Patent Owner contends that the testimony of Mr. Peterson and Dr. Kia in different proceedings “binds Petitioner here” and relies on testimony introduced in another Board proceeding. PO Sur-reply 3; *see* Tr. 47:2–48:5. These arguments were not presented in the Response and are not fairly responsive to the Reply, and as a result, they are untimely and forfeit. *See supra* § II.A. However, even if they had been timely raised, these arguments would not have been persuasive for at least the reasons we

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According to Patent Owner, Petitioner's contentions in this proceeding are undermined by Mr. Peterson's and Dr. Kia's testimony, which indicates that it was neither obvious nor predictable to use a camera phone to remotely deposit a check. *See* PO Resp. 9–17; *see also id.* at 18–21 (faulting Dr. Mowry for failing to address this testimony).

However, Patent Owner's arguments are fundamentally flawed because they fail to account for Garcia, which specifically teaches a system that uses a mobile phone to capture a check image for remote deposit. *E.g.*, Ex. 1003, 1:5–13, 4:10–5:9. This is not a passing reference in Garcia; rather, this is the heart of Garcia's invention. *See, e.g., id.* at Abstr. As a result, Garcia, by itself, is strong evidence that a person of ordinary skill in the art would have expected to be able to remotely deposit a check using a mobile phone. In other words, even if there were challenges associated with using a camera phone to capture a sufficient image to remotely deposit a check, we find Garcia's disclosure to be persuasive evidence that an ordinarily skilled artisan would have expected to be able to successfully address those challenges. We note that we assign significantly more weight to Garcia's disclosure than we do to any expert's testimony because Garcia is documentary evidence written at the relevant time.

Also, Patent Owner's argument fails to address Petitioner's proposed combination, which contends that it would have been obvious to implement Garcia with a downloadable thin client application that provides a user interface and controls a camera (as disclosed in Byrne) and duplicate check detection (as disclosed in Singfield). *E.g.*, Pet. 28. None of the cited

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explain in connection with our analysis of Mr. Peterson's and Dr. Kia's testimony.

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testimony from Mr. Peterson or Dr. Kia indicates that an ordinary artisan would have been discouraged from making the proposed combination or would have not had a reasonable expectation of success. Patent Owner asserts that “Mr. Peterson’s and Dr. Kia’s testimony goes directly to the question of whether there was a motivation to combine Garcia with Byrne/Singfield in the prior art” (PO Resp. 21); however, Patent Owner fails to sufficiently explain this assertion, and having read the cited testimony, we disagree with it.

Given these two fundamental flaws in Patent Owner’s argument, we disagree with Patent Owner’s suggestion that Dr. Mowry should have addressed the differences between camera phones and specialized scanners. *See* PO Resp. 18–21. Also, we discern little probative value in Dr. Mowry’s failure to respond to questions regarding the substance of Mr. Peterson’s and Dr. Kia’s testimony. *See id.*

In addition, we disagree with Patent Owner’s summary of Mr. Peterson’s and Dr. Kia’s testimony. *See* PO Resp. 9. At most, the testimony indicates that (1) an image obtained by a camera phone was materially different than one obtained from a traditional check scanner, (2) it was more challenging to capture a check image of sufficient quality with a camera phone because the resolution, focus, angle, movement, and lighting of the image were unpredictable, and (3) existing algorithms were not able to reliably and consistently correct for these challenges. *See* Ex. 2026, 42:6–44:2, 67:25–69:18, 124:9–25; Ex. 2036, 937:25–939:18, 941:13–25, 943:4–12; *see also* Ex. 2035, 2; Ex. 2036, 937:5–24 (also testifying a check’s routing number, account number, and amount are necessary for a successful deposit, and that an image of a certain quality was needed for an OCR to properly capture that information). Although Mr. Peterson also disagrees



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that “it would have been obvious that a person of skill could create a system that used consumer digital cameras to successfully deposit checks” (Ex. 2026, 124:20–25), we understand this statement, in context, to refer to these challenges associated with creating a commercially viable system and not as a statement that no prior art whatsoever is capable of rendering this concept obvious. *See id.* at 123:8–124:25 (making statement in the context of addressing another company’s efforts to create a working system); Ex. 2025 ¶¶ 3–4 (opining that the challenged claims of the ’598 patent are both obvious and not enabled).<sup>32</sup>

Moreover, we have considered the evidence regarding the challenges associated with using a camera phone to capture a check image, and we find that they would neither have dissuaded an ordinarily skilled artisan from making the proposed combination nor caused him to question the likelihood of success. First, Garcia expressly discloses using a mobile phone to remotely deposit a check. As we discuss above, Garcia is strong evidence that an ordinary artisan would have had a reasonable expectation of success, and we find that an ordinary artisan would not have been discouraged from following Garcia’s teaching. Second, these issues, at most, would have caused the Garcia-Byrne-Singfield combination to be able to deposit a check

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<sup>32</sup> Exhibit 2025 is an excerpt of Mr. Peterson’s expert report, but it does not include the portions of the report that explain these conclusions. Also, it appears that Mr. Peterson considered Garcia and Byrne, but did not address Singfield or the Garcia-Byrne-Singfield combination. *See* Ex. 2025, iii. This is consistent with Petitioner’s representation that it would not advance certain invalidity contentions in district court. Pet. 76 (stipulating that Petitioner “will not advance the grounds that are raised or reasonably could have been raised in this [*inter partes* review] in the co-pending district court proceeding”); *see* Inst. Dec. 12–14 (finding that Petitioner’s stipulation “weighs strongly against discretionary denial”).

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image in *some*, but not *all*, cases. The evidence shows that mobile phones could capture check images of sufficient quality at least some of the time (*see, e.g.*, Ex. 1031 ¶ 126; Ex. 2026, 68:15–18, 71:2–9; Ex. 2036, 970:9–971:6), and we need not decide how often the system would have successfully deposited the check because claim 1 simply requires a method that “initiat[es] and/or log[s] a first deposit” (Ex. 1001, 15:58). We find that the Garcia-Byrne-Singfield combination teaches the performance of this step, and the claim does not require a system that always (or even usually) performs this method. *See Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1326 (Fed. Cir. 2003) (“[A] prior art product that sometimes, but not always, embodies a claimed method nonetheless teaches that aspect of the invention.”); *see also Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1002 (Fed. Cir. 2016) (“[C]ombinations of prior art that sometimes meet the claim elements are sufficient to show obviousness.”).

*iii. Conclusion*

For the reasons provided above, we are persuaded that a person of ordinary skill in the art would have been motivated to combine Garcia, Byrne, and Singfield in the manner proposed by Petitioner, and we are also persuaded that the Garcia-Byrne-Singfield combination teaches or suggests each limitation of claim 1. Accordingly, we determine that Petitioner has shown, by a preponderance of the evidence, that the subject matter of independent claim 1 would have been obvious over Garcia, Byrne, and Singfield.

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2. *Independent Claims 10 and 15*

Petitioner contends that the subject matter of independent claims 10 and 15 would have been obvious in light of the Garcia-Byrne-Singfield combination. Pet. 54–59, 63–69. Petitioner addresses each limitation of these two claims and supports its contentions with analysis and evidence, referencing its earlier analysis of commensurate limitations in independent claim 1 as appropriate. *See id.*

Many of Patent Owner’s arguments regarding claim 1 apply equally to independent claims 10 and 15 (*see* PO Resp. 6–21, 43–62), but those arguments are not persuasive for the reasons explained above (*supra* § II.E.1). Patent Owner does not otherwise dispute Petitioner’s arguments, analysis, or evidence for claims 10 or 15. *See* PO Resp.

Having considered the parties’ arguments and evidence, and for the reasons provided in connection with claim 1, we are persuaded that a person of ordinary skill in the art would have been motivated to combine Garcia, Byrne, and Singfield as proposed, and that the resulting combination teaches or suggests each limitation of independent claims 10 and 15.

3. *Dependent Claim 2*

Claim 2 depends from claim 1 and further recites “passing error processing before initiating and/or logging the deposit of the value to the account.” Ex. 1001, 15:63–65.

Petitioner contends that the Garcia-Byrne-Singfield combination teaches the additionally-recited limitation of claim 2. Pet. 40–44. Petitioner submits that Garcia discloses that the payee bank “[r]ecogniz[es], verif[ies], and electronically treat[s] and process[es] the information received,” but does not provide implementation details for these steps. *Id.* at 40–41

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(quoting Ex. 1003, 6:8–10). According to Petitioner, the additionally-recited subject matter of this claim is disclosed by Byrne. *Id.* at 41–42. In particular, Petitioner points to Byrne’s disclosure that the thin client installed on the mobile device “detect[s] whether the check is endorsed” and “check[s] for an imprint image, a scanned serial number, and the like, to indicate that the check had been properly scanned” before uploading the check image to the payee bank. *Id.* at 41–42 (citing Ex. 1004 ¶¶ 18, 31, 174–180, 191, Fig. 7; Ex. 1002 ¶¶ 113–114).

Petitioner contends that an ordinary artisan would have been motivated to include Byrne’s error checking in the mobile device of the Garcia-Byrne-Singfield combination. Pet. 42–44. In support, Petitioner argues that an ordinary artisan (1) would have known that mobile networks are bandwidth and resource-constrained, (2) “would have been motivated to address errors at Garcia’s mobile device before the check image is transmitted/submitted to avoid wasting communications resources and adding delays,” and (3) would have understood that Byrne provides a solution by checking for errors before the image is sent. *Id.* at 42 (citing Ex. 1003, 11:21–12:1; Ex. 1004 ¶¶ 174–183; Ex. 1002 ¶ 115). Petitioner also argues that an ordinary artisan would have had a reasonable expectation of success in making this combination, and that the combination merely applies a known technique to a known device to yield predictable improvements. *Id.* at 42–44 (citing Ex. 1002 ¶¶ 116–119; Ex. 1004 ¶¶ 173–186; Ex. 1003, 10:10–18; Ex. 1020, 8:23–46).

Patent Owner argues that Petitioner fails to show that an ordinary artisan would have been motivated to shift this burden of error checking to Garcia’s mobile phone. PO Resp. 62–63. Patent Owner also argues that “there would be substantial reason not to do this,” including, for example,

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that mobile phones in the relevant time period did not have the capability to run error checking algorithms successfully. *Id.* at 63. In addition, Patent Owner asserts that Dr. Mowry’s trial testimony undercuts his rationale for combining Garcia and Byrne. *See* PO Resp. 34, 36–38, 41–42, 63.

Having considered the parties’ arguments and evidence, we find that Petitioner has *not* shown, by a preponderance of the evidence, that a person of ordinary skill in the art would have been motivated to combine the references so that Garcia’s mobile device would perform error checking as disclosed by Byrne.<sup>33</sup> *See* Pet. 40–42. Even if an ordinary artisan *could* have made the proposed combination, we are not persuaded that Petitioner has sufficiently shown that he would have been *motivated* to do so.

Initially, we note that Garcia provides a list of functions to be performed by the mobile device, but it does not contemplate performing error checking in the mobile phone. *See* Ex. 1003, 9:19–10:18. Rather, if

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<sup>33</sup> We analyze only the theory presented in the Petition, and we cannot consider other potential obviousness theories. *See PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (The “petitioner’s contentions . . . define the scope of the litigation all the way from institution through to conclusion.” (quoting *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1357 (2018))); *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1381 (Fed. Cir. 2016) (“[T]he Board must base its decision on arguments that were advanced by a party, and to which the opposing party was given a chance to respond.”). As a result, we do not consider whether it would have been obvious for *the payee bank* in Garcia to “pass[] error processing before initiating and/or logging the deposit” because the Petition includes no such contention. *See, e.g.*, Pet. 40–41 (stating that “Garcia does not disclose . . . that verifying includes passing error processing before initiating or logging a deposit”); *see also* Pet. Reply 22 (arguing that “[e]rror checking at the mobile device . . . is indisputably within claim 2’s scope” and that “the prior art makes clear that mobile devices were capable of successfully performing error checking functions”).

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anything, Garcia indicates that the payee bank would perform such a function. *See id.* at 11:7–10 (stating that the payee bank “must have certain electronic means of recognizing, verifying and processing the information sent by the user”); *see also* Ex. 2020, 240:18–24 (Dr. Mowry agreeing that Garcia’s verification process is happening at the bank) (*quoted in* PO Resp. 34).

Petitioner contends that an ordinary artisan would have been motivated to add error processing to Garcia’s mobile phone so that it could address errors before transmitting the check image in order “to avoid wasting communications resources and adding delays.” Pet. 42. But, Petitioner does not support this rationale with a persuasive explanation or evidence. Indeed, we assume that Petitioner’s theory is that the error checking at the mobile device would have conserved bandwidth and reduced delay *because* it would have allowed the mobile device to identify some unsuitable images before they were sent to the payee bank; however, the Petition does not actually include an explanation to this effect. Rather, it simply states that an ordinary artisan would have known that mobile telephone networks (such as that used by Garcia) “are bandwidth and resource-constrained, and that communications over such networks takes time.” *Id.*; *see also* Ex. 1002 ¶ 115. However, *all* networks have bandwidth and resource constraints, and *all* communications take time, and neither the Petition nor Dr. Mowry explain why these considerations would have been relevant to an ordinary artisan implementing Garcia. Indeed, the Petition next asserts that “Byrne provides the requisite solution to this problem” (Pet. 42), but neither the Petition nor Dr. Mowry identify any problem. For example, Dr. Mowry does not testify that an ordinary artisan would have expected Garcia’s system to consume excessive bandwidth or incur

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excessive delay. *See* Ex. 1002 ¶¶ 115–119 (addressing rationale to combine for claim 2). In addition, Petitioner recognizes that the verification process is performed by the payee bank in Garcia, yet does not address the fact that its proposal would apparently shift a portion of the verification process to the mobile phone. *See* Pet. 40–44.

Dr. Mowry’s trial testimony casts further doubt on Petitioner’s rationale for this claim. Dr. Mowry testifies that conserving bandwidth would “potentially” have been one of the goals of an ordinary artisan “depend[ing] on how precious their resource is.” Ex. 2020, 68:12–24. But Dr. Mowry “wouldn’t necessarily characterize [Garcia] as bandwidth intensive.” *Id.* at 76:13–23. In addition, he disagreed that “in the Garcia system, the motivation would have been to shift it to the client side for the verification,” noting simply that “[t]here are tradeoffs” associated with doing the verification processing on either the client or the server. *Id.* at 241:22–242:13. Petitioner attempts to limit the impact of Dr. Mowry’s answers (Pet. Reply 16); however, the fact remains that Petitioner has the burden of proof, and it does not identify persuasive evidence to support its contention. Petitioner’s Reply asserts that these considerations were “particularly important in 2006, when 3G bandwidth was at a premium” (*id.* at 22 (citing Ex. 1029 ¶ 49)), but neither Petitioner nor Dr. Mowry provide analysis or evidence to support this conclusory assertion.

Moreover, the Petition also fails to address whether the proposed combination would have, in fact, conserved communications resources or reduced delays. In Petitioner’s proposed combination, Byrne’s thin client application would be downloaded to Garcia’s mobile phone at each use (which would require communication resources and incur latency), but the Petition fails to address whether the net result of the proposed combination

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would be reduced bandwidth or decreased delays.<sup>34</sup> *See* Ex. 2020, 147:20–148:1 (Dr. Mowry agreeing that the impact of downloading the thin client is not discussed in his report). Moreover, Garcia touts the “speed” of its process, stating that its “immediate processing . . . allows the immediate availability in the user’s account” (Ex. 1003, 7:18–8:3), which indicates that an ordinary artisan would not have perceived a problematic delay in Garcia’s system. Petitioner’s attempt to shift the burden to Patent Owner to determine whether or not its purported benefits would be realized (*see* Pet. Reply 17) is unavailing. In its Reply, Petitioner cites testimony from Dr. Mowry (*see* Ex. 1029 ¶ 37), but it simply compares the size of a compressed image with the size of a “large” application. This evidence does not outweigh the other evidence above, and it was submitted too late to remedy the Petition. *See supra* § II.A.; *see also* Trial Practice Guide 73 (explaining that a petitioner “may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a prima facie case of unpatentability”).

Finally, on this record, we are also not persuaded by Petitioner’s contentions that the proposed combination merely applies a known technique to a known device to yield predictable improvements. *See* Pet. 42–44 (citing Ex. 1002 ¶¶ 116, 119). Petitioner points to Dr. Mowry’s testimony in support, but he simply reiterates Petitioner’s conclusory

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<sup>34</sup> This is problematic in the context of claim 2 (but not claim 1) because Petitioner’s rationale for combining Garcia, Byrne, and Singfield to teach the limitation of claim 2 is predicated on improvements to bandwidth and latency (where the rationale for claim 1 is not). Moreover, unlike Petitioner’s contentions for claim 1 (which propose implementations that are supported by Garcia’s disclosure), Petitioner’s contentions for claim 2 propose a modification of Garcia that alters the reference’s teachings.



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assertions. *See* Ex. 1002 ¶¶ 116, 119 (mirroring the Petition’s statements); 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”); *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15 (PTAB Aug. 24, 2022) (precedential).

Accordingly, we are not persuaded by Petitioner’s rationale to combine Garcia and Byrne in the manner proposed for this claim. As a result, we conclude that Petitioner has not shown, by a preponderance of the evidence, that the subject matter of claim 2 would have been obvious over Garcia, Byrne, and Singfield.

#### *4. Dependent Claims 3–7, 18 and 19*

Claim 3 directly depends from claim 2. Ex. 1001, 15:66–16:3. As explained above, Petitioner has not shown that the subject matter of claim 2 would have been obvious over the combination of Garcia, Byrne, and Singfield. *Supra* § II.E.3. By virtue of dependency, Petitioner also has not shown that the subject matter of claim 3 would have been obvious over Garcia, Byrne, and Singfield.

As for claims 4–7 and 18, Patent Owner contends that the “same analysis” addressed above with respect to claim 2 “applies to claims 4–7 and 18, for which Dr. Mowry relies on the same theory.” PO Resp. 63. Petitioner does not dispute this contention. Pet. Reply 22–26.

For claim 4, we understand the Petition to rely upon the same rationale to combine addressed above in the context of claim 2. *See* Pet. 47–48. As a result, for the reasons explained above with respect to claim 2 (*see supra* § II.E.3), we find that Petitioner has not shown, by a preponderance of the evidence, that a person of ordinary skill in the art would have been

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motivated to combine the references as proposed. As a result, Petitioner has not shown that the subject matter of claim 4 would have been obvious over Garcia, Byrne, and Singfield. Claims 5–7 directly depend from claim 4 (Ex. 1001, 16:9–28), and by virtue of dependency, Petitioner also has not shown that the subject matter of these claims would have been obvious over Garcia, Byrne, and Singfield.

For claim 18, however, the Petition’s contentions are different. *See* Pet. 70–71. Claim 18 directly depends from independent claim 15 and recites that the instructions recited by the independent claim “analyze and confirm that the at least one electronic image of the check meets at least one image criterion before proceeding to activate updating of the account.” Ex. 1001, 18:19–24. For these claimed instructions, Petitioner points to Byrne’s disclosure of the CEO and contends that it would have been obvious for Garcia’s payee bank to include such instructions. Pet. 71 (citing *id.* at 65–67); *see id.* at 65–66 (presenting consistent contention for independent claim 15). As for the additionally-recited limitation of claim 18, Petitioner contends that Byrne discloses scanning a check and detecting endorsement, imprint, and serial number before committing a deposit. *Id.* at 71 (citing Ex. 1004 ¶¶ 175, 191). Although the Petition also cites the discussion of claim 4, we understand this citation to reference the earlier discussion of Byrne’s *teachings*, rather than the discussion of the alleged motivation to add these features of Byrne into Garcia’s mobile device. *See id.* (“Furthermore, Byrne teaches the additional limitations of claim 18. *See* Section X.A.5 [claim 4].” (alterations in original)). Indeed, such an understanding is most consistent with Petitioner’s discussion of independent claim 15, which points to the operations of Garcia’s financial institution, as modified by Byrne’s disclosure, to teach the other operations executed by

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the claimed instructions. *See id.* at 67–69; *see also id.* at 69–70 (claim 16 also alleging that the instructions are executed by the payee bank). In addition, we note that Petitioner’s rationale to add Byrne’s error processing into Garcia’s mobile device is articulated in the discussion of claim 2, which is merely referenced by claim 4. *See* Pet. 40–44, 47–48. Because Patent Owner’s argument is that Petitioner fails to show a motivation to shift the error processing to Garcia’s mobile device (*see* PO Resp. 62–63), we do not agree that the same analysis applies to dependent claim 18 (*see id.* at 63). Moreover, Patent Owner does not otherwise dispute Petitioner’s showing for dependent claim 18. *See* PO Resp.

On this record, we are persuaded by Petitioner’s showing that the additionally-recited limitation of dependent claim 18 would have been obvious over the proposed Garcia-Byrne-Singfield combination. *See* Pet. 70–71 (citing *id.* at 63–69). In particular, we are persuaded that an ordinary artisan would have been motivated to implement Garcia’s deposit functionality at the payee bank using servers, as disclosed by Byrne, and we agree that Garcia’s computer equipment and Byrne’s servers include executable instructions. *See id.* at 65–67, 71. We are further persuaded that Byrne teaches analyzing and confirming that the check image meets at least one criterion before updating the account, as further recited by claim 18. *See id.* at 71 (citing Ex. 1004 ¶¶ 175, 191); *see* Ex. 2031 ¶ 39 (Dr. Creusere testifying that “Byrne . . . performs all of its image quality analysis on the bank server”). In addition, we find that an ordinarily skilled artisan would have been motivated to combine these references as proposed, and we find that the proposed Garcia-Byrne-Singfield combination teaches all the limitations of independent claim 15, which are included in dependent claim 18 by virtue of dependency. *See supra* § II.E.2. As a result, we determine

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that Petitioner has shown, by a preponderance of the evidence, that the subject matter of claim 18 would have been obvious over Garcia, Byrne, and Singfield.

Claim 19 directly depends from claim 18 and further recites that the instructions recited by independent claim 15 also “confirm the at least one electronic image of the check is legible, is appropriately sized, has an appropriate orientation, has an appropriate format, includes a validating image feature, includes a properly located image feature properly, or a combination thereof before proceeding to activate updating of the account.” Ex. 1001, 18:25–34. Petitioner contends that Byrne teaches these additionally-recited limitations. Pet. 71–72 (citing *id.* at 49–50, 69–71). In particular, Petitioner argues that Byrne’s system uses a “checking means, such as checking for an imprint image, as scanned serial number, and the like, to indicate that the check had been properly scanned.” *Id.* at 49–50 (emphasis omitted) (quoting Ex. 1004 ¶ 175; *citing* Ex. 1004 ¶ 173; Ex. 1002 ¶ 138). Patent Owner does not dispute Petitioner’s showing for dependent claim 19. *See* PO Resp. On this record, upon consideration of the evidence and argument presented, we are persuaded by Petitioner’s undisputed showing that the additionally-recited limitation of dependent claims 19 would have been obvious over the proposed Garcia-Byrne-Singfield combination. *See* Pet. 71–72 (citing *id.* at 49–50, 69–71). As a result, we determine that Petitioner has shown, by a preponderance of the evidence, that the subject matter of claim 19 would have been obvious over Garcia, Byrne, and Singfield.

In sum, we conclude that Petitioner has shown, by a preponderance of the evidence, that the subject matter of claims 18 and 19 would have been obvious over Garcia, Byrne, and Singfield, but we conclude that Petitioner

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has not shown, by a preponderance of the evidence, that the subject matter of claims 3–7 would have been obvious over these references.

*5. Dependent Claims 8, 9, 11–14, 16, and 20*

Claims 8 and 9 directly depend from independent claim 1, claims 11–14 directly depend from independent claim 10, and claims 16 and 20 directly depend from independent claim 15. Ex. 1001, 16:29–35, 16:61–17:16, 18:10–14, 18:35–38. Petitioner contends that these dependent claims would have been obvious over Garcia, Byrne, and Singfield. Pet. 47–54, 59–62, 69–72. Patent Owner does not separately dispute these contentions. *See* PO Resp.

Having considered the record, we are persuaded by Petitioner’s undisputed showing that each additionally-recited limitation of dependent claims 8, 9, 11–14, 16, and 20 would have been obvious over the proposed Garcia-Byrne-Singfield combination. *See* Pet. 51–54, 59–62, 69–70, 72. In addition, as explained above (*supra* § II.E.1–2) and for the reasons explained by Petitioner in its additional analysis of these claims, we find that an ordinarily skilled artisan would have been motivated to combine these references as proposed, and we find that the proposed Garcia-Byrne-Singfield combination teaches the requirements of the respective independent claims.

Accordingly, we conclude that Petitioner has shown, by a preponderance of the evidence, that the subject matter of claims 8, 9, 11–14, 16, and 20 would have been obvious over Garcia, Byrne, and Singfield.

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*F. Obviousness Ground Based on Garcia, Byrne, Singfield, and Adusumilli*

Claim 17 depends from independent claim 15 (Ex. 1001, 18:15–17), and Petitioner contends that the subject matter of this claim would have been obvious over Garcia, Byrne, Singfield, and Adusumilli (Pet. 72–76). Patent Owner does not separately dispute this contention. *See* PO Resp.

Having considered the record, we are persuaded by Petitioner’s undisputed showing that Adusumilli teaches the additionally-recited limitation of claim 17 (*see* Pet. 72–75), and that an ordinary artisan would have been motivated to combine this teaching of Adusumilli with Garcia (*see id.* at 75–76). In addition, as explained above (*supra* § II.E.1–2), we find that an ordinarily skilled artisan would have been motivated to combine Garcia, Byrne, and Singfield, and we find that the proposed Garcia-Byrne-Singfield combination teaches or suggests all the limitations of the corresponding independent claim.

Accordingly, we conclude that Petitioner has shown, by a preponderance of the evidence, that the subject matter of claim 17 would have been obvious over Garcia, Byrne, Singfield, and Adusumilli.

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### III. CONCLUSION<sup>35</sup>

Based on the evidence presented with the Petition, the evidence introduced during the trial, and the parties' respective arguments, Petitioner has shown by a preponderance of the evidence that claims 1 and 8–20 are unpatentable, but Petitioner has not shown that claims 2–7 are unpatentable.

In summary:

<b>Claim(s)</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/ Basis</b>	<b>Claims Shown Unpatentable</b>	<b>Claims Not Shown Unpatentable</b>
1–16, 18–20	103(a)	Garcia, Byrne, Singfield	1, 8–20	2–7
17	103(a)	Garcia, Byrne, Singfield, Adusumilli	17	
<b>Overall Outcome</b>			<b>1, 8–20</b>	<b>2–7</b>

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<sup>35</sup> Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*, 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

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#### IV. ORDER

Accordingly, it is

ORDERED that claims 1 and 8–20 of the '598 patent are determined to be unpatentable;

FURTHER ORDERED that claims 2–7 of the '598 patent are not determined to be unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.



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(12) **United States Patent**  
**Oakes, III et al.**

(10) **Patent No.:** **US 10,769,598 B1**

(45) **Date of Patent:** **Sep. 8, 2020**

(54) **SYSTEMS AND METHODS FOR REMOTE DEPOSIT OF CHECKS**

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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/709,071**

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**Related U.S. Application Data**

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(51) **Int. Cl.**  
**G06Q 20/04** (2012.01)  
**G06K 9/00** (2006.01)  
**G06Q 20/10** (2012.01)

(52) **U.S. Cl.**

CPC ..... **G06Q 20/042** (2013.01); **G06K 9/00442** (2013.01); **G06Q 20/108** (2013.01)

(58) **Field of Classification Search**

CPC .... **G06K 9/36**; **G06K 9/3283**; **G06K 9/00442**; **G06Q 20/042**; **H04N 5/225**  
(Continued)

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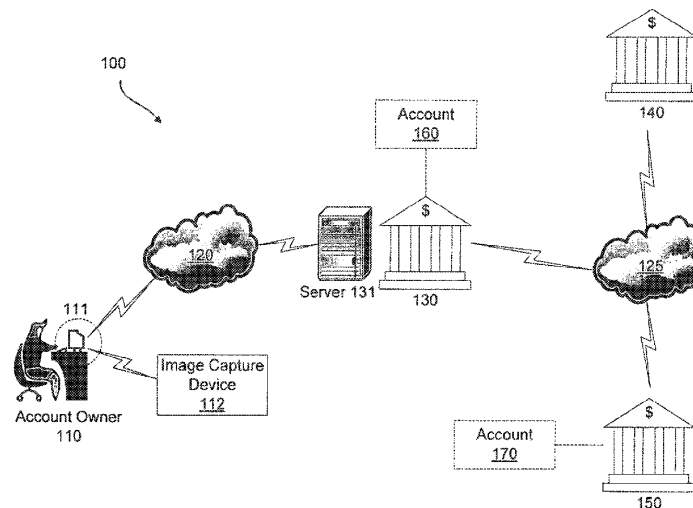
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(57) **ABSTRACT**

Remote deposit of checks can be facilitated by a financial institution. A customer's general purpose computer and image capture device may be leveraged to capture an image of a check and deliver the image to financial institution electronics. Additional data for the transaction may be collected as necessary. The transaction can be automatically accomplished utilizing the images and data thus acquired.

**20 Claims, 6 Drawing Sheets**



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## Related U.S. Application Data

continuation of application No. 11/590,974, filed on  
Oct. 31, 2006, now Pat. No. 8,708,227.

## (58) Field of Classification Search

USPC ..... 235/379; 382/275  
See application file for complete search history.

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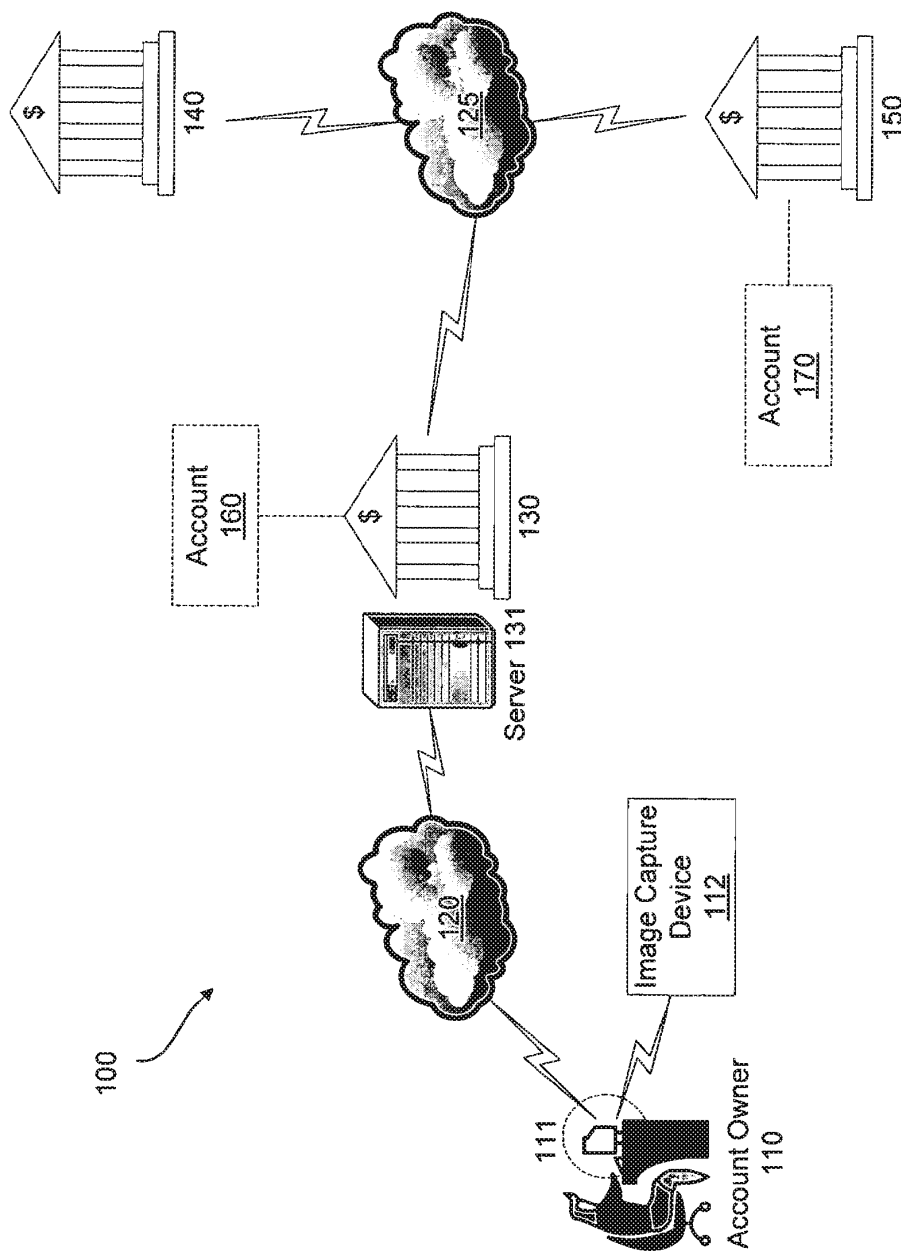


FIGURE 1

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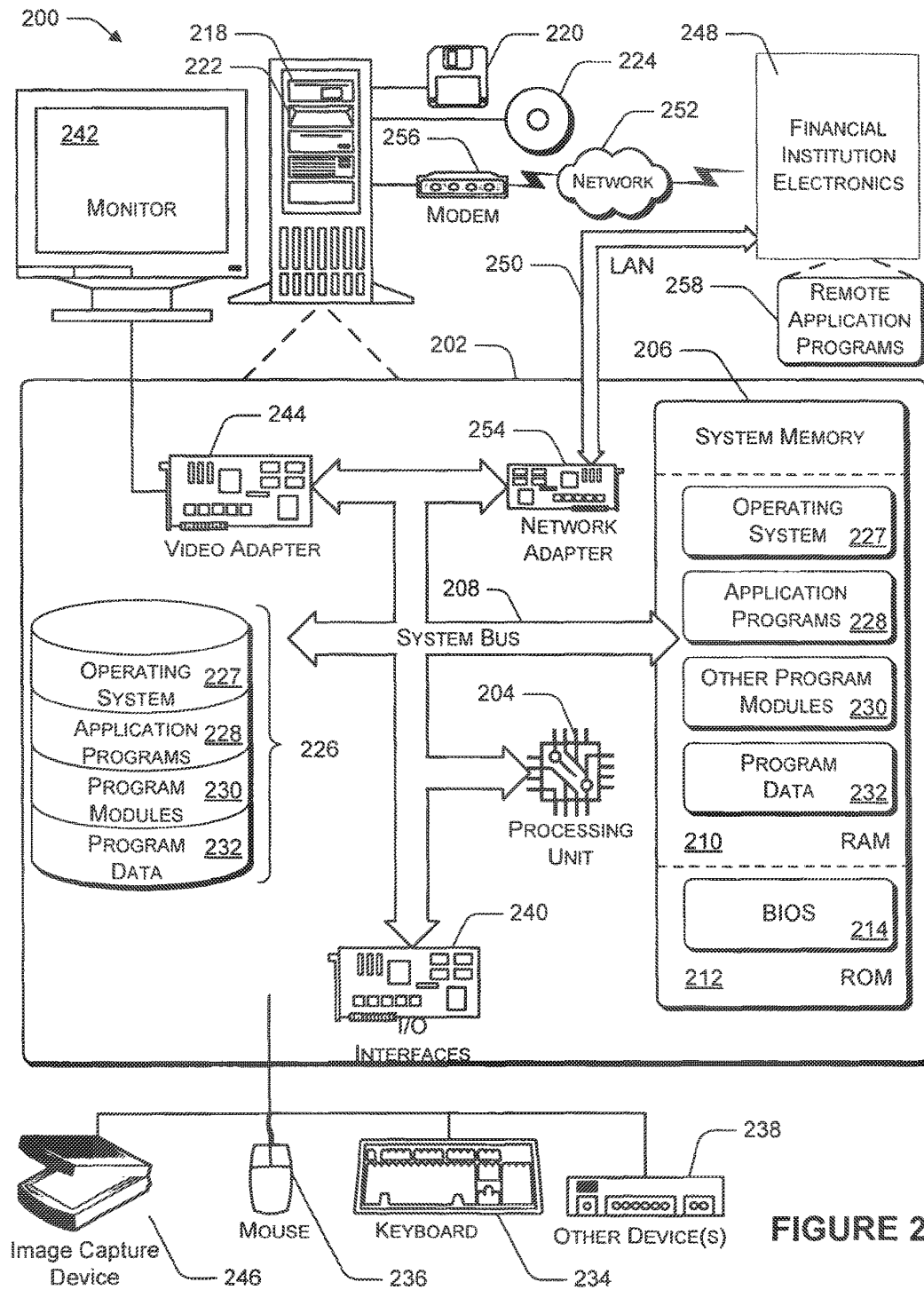


FIGURE 2

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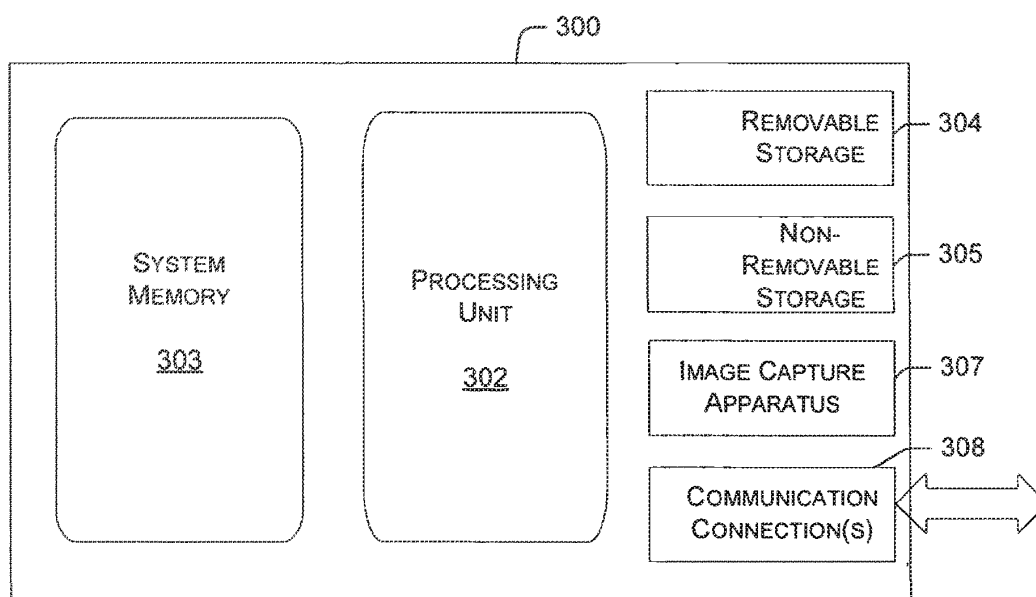


FIGURE 3

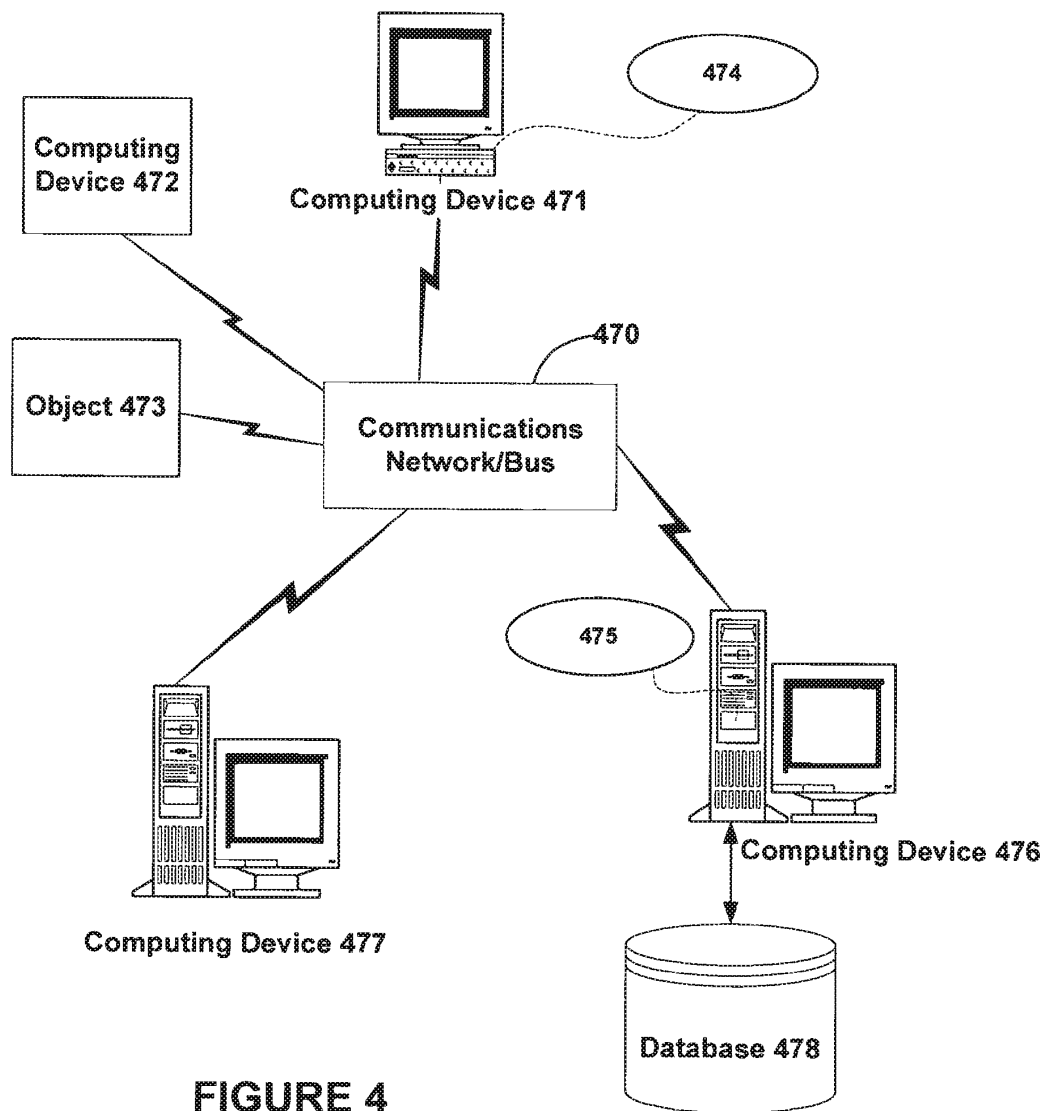


FIGURE 4

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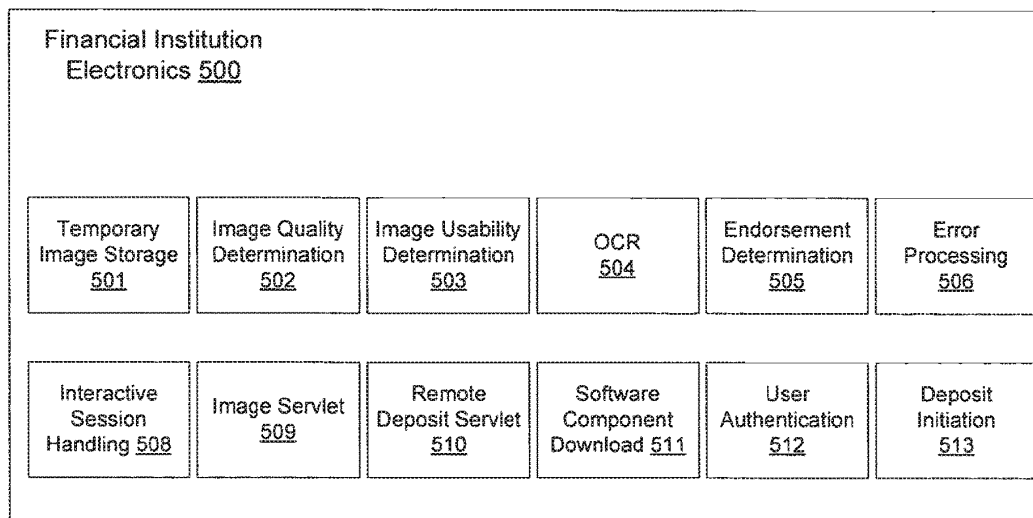
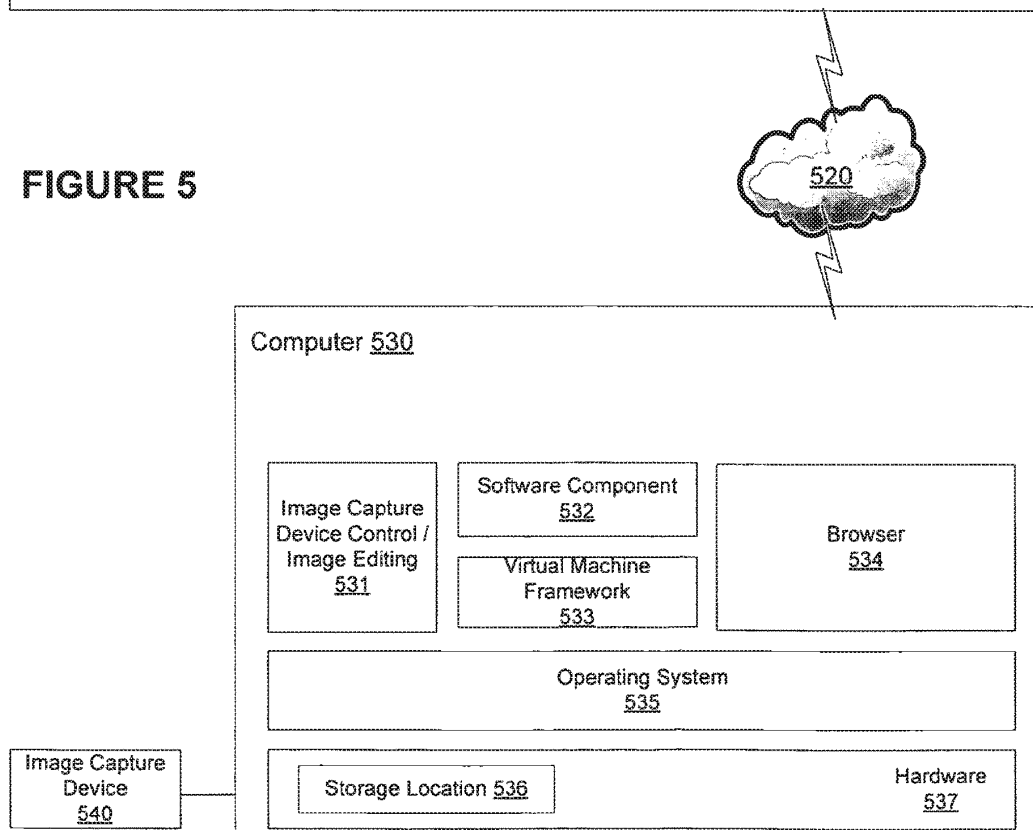


FIGURE 5





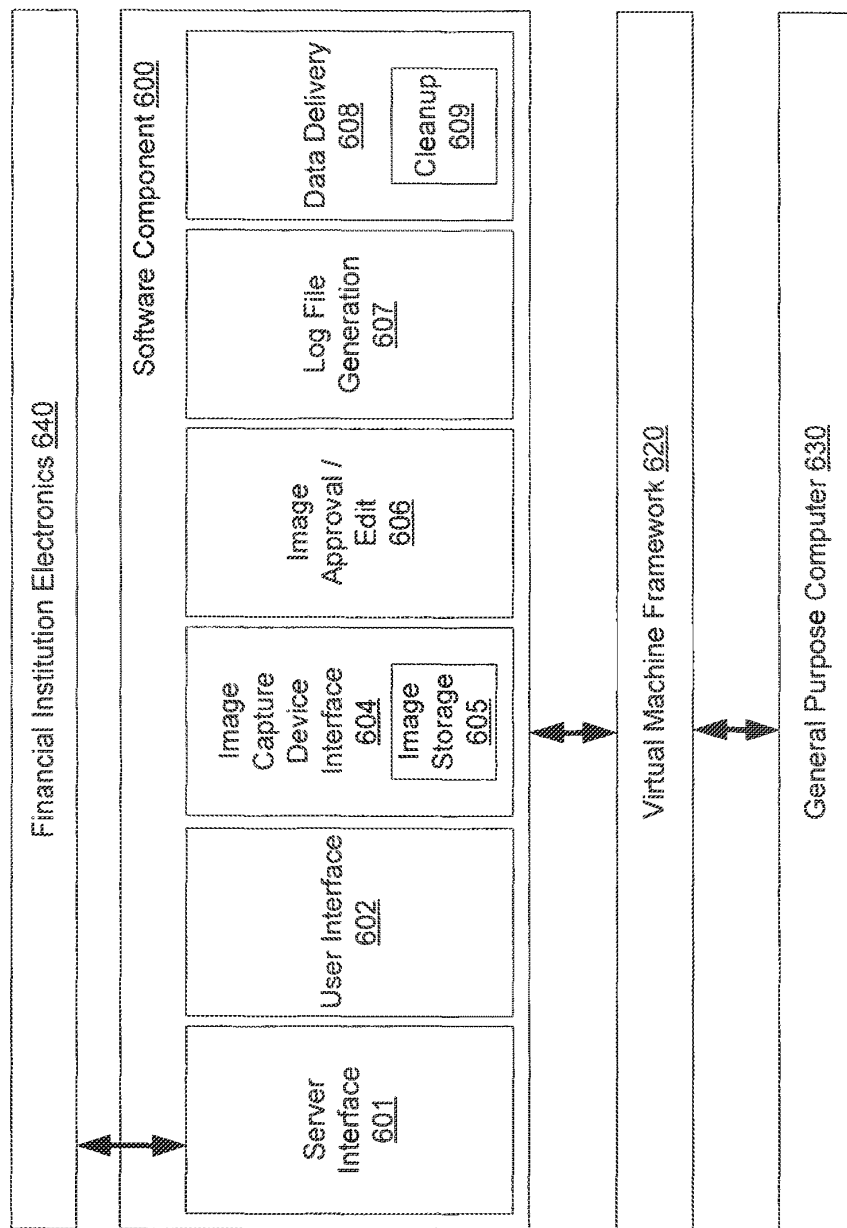


FIGURE 6

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**SYSTEMS AND METHODS FOR REMOTE  
DEPOSIT OF CHECKS****CROSS-REFERENCE TO RELATED  
APPLICATIONS**

This application is a continuation of U.S. patent application Ser. No. 14/225,090, filed on Mar. 25, 2014, which is a continuation of U.S. patent application Ser. No. 11/590,974, now U.S. Pat. No. 8,708,227, filed on Oct. 31, 2006, each of which is incorporated by reference in its entirety.

This application is related by subject matter to U.S. patent application Ser. No. 11/591,003, U.S. patent application Ser. No. 11/591,014, U.S. patent application Ser. No. 11/590,971, U.S. patent application Ser. No. 11/591,247, U.S. patent application Ser. No. 11/590,963, and U.S. patent application Ser. No. 11/591,025, all filed on Oct. 31, 2006 and also entitled "Systems and Methods for Remote Deposit of Checks."

This application is also related by subject matter to U.S. patent application Ser. No. 11/321,025, U.S. patent application Ser. No. 11/321,027, U.S. patent application Ser. No. 11/320,998 all filed on Dec. 29, 2005 and entitled "Remote Deposit of Checks," and U.S. patent application Ser. No. 11/591,131 filed Oct. 31, 2006 also entitled "Remote Deposit of Checks."

**BACKGROUND**

As described in U.S. patent application Ser. No. 11/321,025, checks typically provide a safe and convenient method for an individual to purchase goods and/or services. To use a check, the individual usually must open a checking account, or other similar account, at a financial institution and deposit funds, which are then available for later withdrawal. To pay for goods and/or services with a check, the payor (i.e., the buyer) usually designates a payee (i.e., the seller) and an amount payable on the check. In addition, the payor often signs the check. Once the check has been signed, it is usually deemed negotiable, meaning the check may be validly transferred to the payee upon delivery. By signing and transferring the check to the payee, the payor authorizes funds to be withdrawn from the payor's account on behalf of the payee in return for the goods and/or services provided by the payee.

Checks have certain advantages over other forms of payment, such as cash. For example, while often considered the most liquid type of asset, cash also may be the least secure. Unlike a check, cash is usually freely transferable and does not have to be endorsed. Thus, the owner and possessor of cash is most often the same individual. Because cash is freely transferable, cash that is lost or stolen typically cannot be recovered. Therefore, the risks associated with cash transactions are often unacceptable, particularly with respect to transactions not conducted in person (e.g., by mail) and/or involving large sums of money. A check, on the other hand, provides a payor with more security because the check usually requires a payor to specify both the person and amount to be paid. Furthermore, as noted above, the check is usually not valid until it is properly signed by the payor. These safeguards help to reduce the risk that money will be lost and/or stolen and ensure that the proper payee receives the proper amount of money.

Cash may have other disadvantages as well. For example, because cash is freely transferable, there may be little or no verifiable transaction history. It is often desirable for a payor and/or payee to have physical proof that a particular trans-

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action took place. This typically requires that the payor receive a receipt. However, receipts may contain errors and can be easily misplaced. In contrast, a bank processing a check will ordinarily create a transaction history, which may include the identity of the payee, the amount to be paid, the date of the payment, and the signature of the payor. This enables both a payor and payee to independently verify the accuracy of most transactions involving a payment by check.

While a check may provide a payor with a convenient and secure form of payment, receiving a check may put certain burdens on the payee, such as the time and effort required to deposit the check. For example, depositing a check typically involves going to a local bank branch and physically presenting the check to a bank teller. In addition to the time commitment that may be required, visiting a bank branch may be problematic for the payee if the bank's hours of operation coincide with the payee's normal hours of employment. Thus, the payee may be required to leave work early and/or change work schedules.

A check may pose other burdens for the payee. As noted above, a check may not be freely transferable, thereby limiting the payee's ability to use funds from the check. For example, it is usually difficult for the payee to purchase goods and/or services using a check issued by the payor. While the check may be endorsed and accepted by a third party, such transactions are often disfavored because the third party may not know the payor and, thus, may not be willing to accept the risk that the payor has insufficient funds to cover the check. Therefore, the payee may not have access to the funds from the check until the payee deposits the check at the bank, the check has cleared and the funds have been credited to the payee's account. The payee may have to wait even longer if the payee chooses to deposit the check by mail. Therefore, there is a need for a convenient method of remotely depositing a check while enabling the payee to quickly access the funds from the check.

**SUMMARY**

The described embodiments contemplate a system, method and computer-readable medium with computer-executable instructions for remotely redeeming a negotiable instrument. In an embodiment, a novel system may include financial institution electronics, such as a server equipped with appropriate hardware and software for facilitating deposit of a check. Such electronics may be configured for receiving from a customer computer an identification of an account for deposit of a check, and an amount of said check. They may be further configured for receiving an image of a front side of said check, and for analyzing said image to determine if it meets at least one criterion. The criterion could be, for example, image size, image legibility, image orientation, image format, presence of certain image features that indicate the image in fact represents a check, and so forth. Financial institution electronics may be also configured for determining if there is an error in a deposit transaction. Numerous errors are possible candidates for detection, and several exemplary errors are provided herein. If there are no errors that warrant aborting the transaction, then such electronics may be further configured to initiate a deposit of the check.

In another embodiment, a novel system may include, for example, a computer readable medium bearing instructions that can configure a customer's general purpose computer to facilitate a check deposit. Acting under direction of such instructions, the general purpose computer may instruct a

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customer, for example via a display coupled such computer, in utilizing an image capture device to generate an electronic image of a front side of a check, such that said electronic image of a front side of a check meets at least one first criterion such as image size, image legibility, image orientation, image quality, and location and/or orientation of the check within the image. Instructions may further be provided for receiving the image of a front side of a check from said image capture device, and optionally instructing the customer to process the image, e.g., by approving the image and/or modifying it to meet at least one second criterion. A second criterion might also be, for example, one or more of image size, image legibility, image orientation, image quality, and location and/or orientation of the check within the image. Finally, the customer computer, acting under direction of the instructions, may deliver an approved electronic image to financial institution electronics.

Additional advantages and features of the invention are described below.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The systems and methods for remote deposit of checks in accordance with the present disclosure are further described with reference to the accompanying drawings in which:

FIG. 1 illustrates a broad view of a system in which the described embodiments may be employed.

FIG. 2 an exemplary general purpose computing device that is communicatively coupled to financial institution electronics as well as an image capture device.

FIG. 3 illustrates an exemplary schematic architecture of an image capture device as well as in connection with various embodiments of the invention.

FIG. 4 illustrates an exemplary network architecture as may connect the customer's general purpose computer to financial institution electronics and may also serve to connect components of financial institution electronics as well as various financial institutions to one another.

FIG. 5 illustrates financial institution electronics coupled to a computer 530, and the various aspects of electronics 500 and computer 530 that may operate to implement the novel systems, methods, and computer readable media set forth herein.

FIG. 6 illustrates a view of the invention with particular focus on the software component 600 which may perform certain operations in connection with embodiments of the invention.

#### DETAILED DESCRIPTION

Certain specific details are set forth in the following description and figures to provide a thorough understanding of various embodiments of the invention. Certain well-known details often associated with computing and software technology are not set forth in the following disclosure, however, to avoid unnecessarily obscuring the various embodiments of the invention. Further, those of ordinary skill in the relevant art will understand that they can practice other embodiments of the invention without one or more of the details described below. Finally, while various methods are described with reference to steps and sequences in the following disclosure, the description as such is for providing a clear implementation of embodiments of the invention, and the steps and sequences of steps should not be taken as required to practice this invention.

FIG. 1 illustrates an example system in which the described embodiments may be employed. System 100 may

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include account owner 110, e.g., a bank customer who may be located, for example, at the customer's private residence. The account owner 110 may be utilizing a customer-controlled, general purpose computer 111. General purpose computer may be coupled to an image capture device 112. Customer 110 may use the image capture device 112 to generate an image of a negotiable instrument such as a check, and may send the image, along with any other data as appropriate, via a publicly accessible network 120 to financial institution 130 electronics such as server 131.

In one embodiment, the financial institution controlling electronics 131 is also the institution at which the customer has an account 160. Financial institution 130 may perform a variety of steps to process the incoming check image and other data. For example, financial institution may ensure the check is valid, ensuring the check image is in proper form for electronic handling, ensure it is not a duplicate of a previously deposited check, and so forth. Financial institution 130 may also forward the image over a network 125 to one or more other entities 140, 150, which may be associated with an account 170 on which the check was drawn.

A general purpose computer 111 is generally a Personal Computer (PC) running one of the well-known WINDOWS® brand operating systems made by MICROSOFT® Corp., or a MACINTOSH® (Mac) brand computer, running any of the APPLE® operating systems. General purpose computers are ubiquitous today and the term should be well understood. A general purpose computer 111 may be in a desktop or laptop configuration, and generally has the ability to run any number of applications that are written for and compatible with the computer's operating system. The term "general purpose computer" specifically excludes specialized equipment as may be purchased by a business or other commercial enterprise, for example, for the specialized purpose of high-speed, high-volume check deposits. A particular advantage of embodiments of the invention is its ability to operate in conjunction with electronics that today's consumers actually own or can easily acquire, such as a general purpose computer, a scanner, and a digital camera.

An exemplary general purpose computer 111 as may be utilized in conjunction with embodiments of the invention is illustrated in FIG. 2. Device electronics 200 are illustrated in FIG. 2, and a schematic blowup 202 is provided to illustrate an exemplary internal architecture of the device. Computing architecture 202 includes one or more processors or processing units 204, a system memory 206, and a bus 208 that couples various system components including the system memory 206 to processors 204. The bus 208 represents one or more of any of several types of bus structures, including a memory bus or memory controller, a peripheral bus, an accelerated graphics port, and a processor or local bus using any of a variety of bus architectures. The system memory 206 includes read only memory (ROM) 212 and random access memory (RAM) 210. A basic input/output system (BIOS) 214, containing the basic routines that help to transfer information between elements within computing device 200, such as during start-up, is stored in ROM 212.

Computing architecture 202 further includes a hard disk drive 226, and may include a magnetic disk drive 2218 for reading from and writing to a removable magnetic disk 220, and an optical disk drive 222 for reading from or writing to a removable optical disk 224 such as a CD ROM or other optical media. The hard disk drive 226, magnetic disk drive 218, and optical disk drive 224 are connected to the bus 208 by appropriate interfaces. The drives and their associated computer-readable media provide nonvolatile storage of computer-readable instructions, data structures, program

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modules and other data for computing device 200. Although the exemplary environment described herein employs a hard disk, a removable magnetic disk 218 and a removable optical disk 224, other types of computer-readable media such as magnetic cassettes, flash memory cards, digital video disks, random access memories (RAMs), read only memories (ROMs), and the like, may also be used in the exemplary operating environment.

A number of program modules may be stored on the hard disk 226, magnetic disk 218, optical disk 224, ROM 212, or RAM 210, including an operating system 227, one or more application programs 228, other program modules 230, and program data 232. A user may enter commands and information into computing device 200 through input devices such as a keyboard 234 and a pointing device 236. An image capture device 246 may also be coupled to the general purpose computer 200 as an input device. Other input devices 238 may include a microphone, joystick, game pad, satellite dish, or the like. These and other input devices are connected to the processing unit 204 through interfaces 240 that are coupled to the bus 208. A monitor 242 or other type of display device is also connected to the bus 208 via an interface 224, such as a video adapter 224.

Generally, the data processors of computing device 200 are programmed by means of instructions stored at different times in the various computer-readable storage media of the computer. Programs and operating systems may be distributed, for example, on floppy disks, CD-ROMs, or electronically, and are installed or loaded into the secondary memory of a computer. At execution, the programs are loaded at least partially into the computer's primary electronic memory 206.

Computing device 200 may operate in a networked environment using logical connections to one or more remote computers, such as financial institution electronics 248. The financial institution electronics 248 may be one or more server computers, routers, network PCs, and so forth, which typically include many or all of the elements described above relative to computing device 200. The financial institution electronics 248 may run remote application programs 258 which may operate in concert with application programs 228 that execute on the computer 200. For example, a "software component" as described herein may, in one embodiment, execute pursuant to commands from a remote application program 258. The software component may of course also operate in a more autonomous manner, performing certain tasks and then communicating data as necessary back to the remote application programs 258.

When used in a LAN networking environment, a computer 200 is connected to a local network 250 through a network interface or adapter 254. When used in a WAN networking environment, computing device 200 typically includes a modem 256 or other means for establishing communications over the wide area network 252, such as the Internet. The modem 256, which may be internal or external, can be connected to the bus 208 for example via a serial port interface, or by sending a signal to a wireless router which then broadcasts and receives wireless signals to and from a wireless card that is connected to the computer 200.

In a networked environment, program modules depicted relative to the computing device 200, or portions thereof, may be stored in the remote memory storage device. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers may be used.

A general purpose computer such as 200 may also be "customer-controlled." A common example of a customer-

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controlled computer would be a typical computer located in a private residence. The owner of such a computer typically has the power to install programs and configure the computer as they wish, subject to certain security restrictions that may be imposed by the hardware or software manufacturers. A customer-controlled computer need not be located in a private residence, however. For example, computers in college dormitories, in workplace offices, and so forth may also be considered to be "customer-controlled."

An example of a computer that would not be considered customer-controlled would be an Automatic Teller Machine (ATM) that is typically controlled by a bank or other business. Although a customer may access and utilize an ATM machine, the ATM machine is not customer-controlled because the allowed uses of the ATM machine are highly restricted. Relevant factors in determining whether a machine is customer controlled are thus the scope of operations that a customer may perform using the machine, and extent to which the customer can reconfigure the machine in some way by adding software and/or hardware components.

One of the applications 228 that may run on a general purpose computer 200 in connection with the invention is a browser. Common browsers in use today are, for example, the popular INTERNET EXPLORER® line of browsers made by MICROSOFT® Corp., the FIREFOX® browsers distributed via the MOZILLA® open source project, and the NETSCAPE NAVIGATOR® browsers also distributed via the MOZILLA® open source project. Browsers generally allow users to point to a Uniform Resource Locator (URL), and thereby retrieve information such as a web page. For example, a browser application on computer 200 could retrieve a web page that is kept at server associated with financial institution electronics 248, and display the web page on display 242 to the account owner 110 (FIG. 1), as is generally known and appreciated in the industry and by the general public.

Another application 228, or set of applications, that may run on a general purpose computer 200 in connection with the invention comprises "virtual machine" technologies such as the JAVA® virtual machine software distributed by SUN MICROSYSTEMS® Corp, and .NET® Framework distributed by MICROSOFT® Corp. In general, such applications facilitate execution of further application programs 228 in a variety of computing environments. For example, a JAVA® applet is a computer program (which may be alternatively referred to herein as a "software component") that can execute on any computer running the JAVA® virtual machine software. The applet may be provided to virtual machine software in a "source code" format, and may be compiled by a "just in time" compiler, so as to put the applet in a form that can be executed by the hardware associated with the particular computing device. These technologies are known in the art and may be utilized in connection with certain embodiments of the invention as described herein.

Referring back to FIG. 1, an image capture device 112 may be communicatively coupled to the computer 111. Image capture device 112 may be, for example, a scanner or digital camera. Computer 111 may comprise software that allows the user to control certain operations of the image capture device 112 from the computer 111. For example, modem scanner users may be familiar with the TWAIN® software is often used to control image capture from a computer 111. Similarly, digital cameras often ship along with software that allows users to move images from the camera to a computer 111, and may also provide additional functions, such as photo editing functions crop and rotate.

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Referring now to FIG. 3, a schematic illustration of an exemplary image capture device architecture 300 is illustrated. As with the general purpose computer 200 of FIG. 2, an image capture device may comprise a processing unit 302 and memory 303. Depending on the exact configuration and type of image capture device, memory 303 may be volatile (such as RAM), non-volatile (such as ROM, flash memory, etc.) or some combination of the two. Additionally, image capture device 300 may have mass storage (removable 304 and/or non-removable 305) such as magnetic or optical disks or tape. Image capture device 300 may have image capture apparatus 307 such as a scanner bed, camera lens, and so forth. Finally, image capture device 300 may include communication connections 308 to other devices, computers, networks, servers, etc. using either wired or wireless media. In particular, communication connections 308 may serve to communicatively couple device to a general purpose computer such as provided in FIG. 2.

Referring back to FIG. 1, financial institutions 130, 140 and 150 may be any type of entity capable of processing a transaction involving a negotiable instrument. For example, financial institutions 130, 140 and 150 may be a retail bank, investment bank, investment company, regional branch of the Federal Reserve, clearinghouse bank and/or correspondent bank. A negotiable instrument is usually a type of contract that obligates one party to pay a specified sum of money to another party. By way of example, and not limitation, negotiable instruments may include a check, draft, bill of exchange, promissory note, and the like.

Financial institution 130 is illustrated as associated with a server 131. Financial institution 130 may maintain and operate server 131 for the purposes of communicating with customers such as 110. Alternatively, such server may be maintained and operated by one or more third party vendors who act under the instructions of the financial institution 130, but possess skills and resources that may be more effective in competent operation of electronics. Such arrangements are well known in the industry and in this case the server 131 is nonetheless considered to be "associated" with the financial institution 130.

Account owner 110 may be an individual who owns account 160, which may be held at financial institution 130. As such, account owner 110 may be described as a customer of financial institution 130 and/or a "payee" because it is contemplated that customer 110 may deposit a check made out to him- or herself. Embodiments of the invention are also possible, however, in which the customer deposits a check made to another payee, in which case the customer and payee are not one and the same. Account 160 may be any type of account for depositing funds, such as a savings account, checking account, brokerage account, and the like. Account owner 110 may communicate with financial institution 130 by way of communication network 120, which may include an intranet, the Internet, a local area network (LAN), a wide area network (WAN), a public switched telephone network (PSTN), a cellular network, a voice over internet protocol (VoIP) network, and the like. Account owner 110 may communicate with financial institution 130 by phone, email, instant messaging, facsimile, and the like.

In one contemplated embodiment, network 120 is a publicly accessible network such as the Internet, which can presently be accessed from many private residences and many public places such as college campuses, airports, coffee shops, and restaurants throughout the United States as well as many other countries of the world. A variety of technologies are available to establish secure connections over such a public network, so that data transmitted between

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computer 111 and a server 131 associated with the institution 130 remains either inaccessible or indecipherable by third parties that may intercept such data. The invention may make use of any such security technologies.

Financial institutions 130, 140 and 150 may communicate with each other via a network 125. Network 125 may be a publicly accessed network such as 120. Alternatively, network 125 may have certain characteristics that differ from network 120, due to the different requirements of bank-to-bank communications. For example, one might envision certain security features and access restrictions being more important in bank-to-bank communications.

FIG. 4 illustrates an exemplary computer network as may be implemented in connection with 120 and 125. One of ordinary skill in the art can appreciate that networks can connect any computer or other client or server device, or in a distributed computing environment. In this regard, any computer system or environment having any number of processing, memory, or storage units, and any number of applications and processes occurring simultaneously is considered suitable for use in connection with the systems and methods provided.

Distributed computing provides sharing of computer resources and services by exchange between computing devices and systems. These resources and services include the exchange of information, cache storage and disk storage for files. Distributed computing takes advantage of network connectivity, allowing clients to leverage their collective power to benefit the entire enterprise. In this regard, a variety of devices may have applications, objects or resources that may implicate the processes described herein.

FIG. 4 provides a schematic diagram of an exemplary networked or distributed computing environment. The environment comprises computing devices 471, 472, 476, and 477 as well as objects 473, 474, and 475, and database 478. Each of these entities 471, 472, 473, 474, 475, 476, 477 and 478 may comprise or make use of programs, methods, data stores, programmable logic, etc. The entities 471, 472, 473, 474, 475, 476, 477 and 478 may span portions of the same or different devices such as PDAs, audio/video devices, MP3 players, personal computers, etc. Each entity 471, 472, 473, 474, 475, 476, 477 and 478 can communicate with another entity 471, 472, 473, 474, 475, 476, 477 and 478 by way of the communications network 470. In this regard, any entity may be responsible for the maintenance and updating of a database 478 or other storage element.

This network 470 may itself comprise other computing entities that provide services to the system of FIG. 4, and may itself represent multiple interconnected networks. In accordance with an aspect of the invention, each entity 471, 472, 473, 474, 475, 476, 477 and 478 may contain discrete functional program modules that might make use of an API, or other object, software, firmware and/or hardware, to request services of one or more of the other entities 471, 472, 473, 474, 475, 476, 477 and 478.

It can also be appreciated that an object, such as 475, may be hosted on another computing device 476. Thus, although the physical environment depicted may show the connected devices as computers, such illustration is merely exemplary and the physical environment may alternatively be depicted or described comprising various digital devices such as PDAs, televisions, MP3 players, etc., software objects such as interfaces, COM objects and the like.

There are a variety of systems, components, and network configurations that support distributed computing environments. For example, computing systems may be connected together by wired or wireless systems, by local networks or

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widely distributed networks. Currently, many networks are coupled to the Internet, which provides an infrastructure for widely distributed computing and encompasses many different networks. Any such infrastructures, whether coupled to the Internet or not, may be used in conjunction with the systems and methods provided.

A network infrastructure may enable a host of network topologies such as client/server, peer-to-peer, or hybrid architectures. The “client” is a member of a class or group that uses the services of another class or group to which it is not related. In computing, a client is a process, i.e., roughly a set of instructions or tasks, that requests a service provided by another program. The client process utilizes the requested service without having to “know” any working details about the other program or the service itself. In a client/server architecture, particularly a networked system, a client is usually a computer that accesses shared network resources provided by another computer, e.g., a server. In the example of FIG. 4, any entity 471, 472, 473, 474, 475, 476, 477 and 478 can be considered a client, a server, or both, depending on the circumstances.

A server is typically, though not necessarily, a remote computer system accessible over a remote or local network, such as the Internet. The client process may be active in a first computer system, and the server process may be active in a second computer system, communicating with one another over a communications medium, thus providing distributed functionality and allowing multiple clients to take advantage of the information-gathering capabilities of the server. Any software objects may be distributed across multiple computing devices or objects.

Client(s) and server(s) communicate with one another utilizing the functionality provided by protocol layer(s). For example, HyperText Transfer Protocol (HTTP) is a common protocol that is used in conjunction with the World Wide Web (WWW), or “the Web.” Typically, a computer network address such as an Internet Protocol (IP) address or other reference such as a Universal Resource Locator (URL) can be used to identify the server or client computers to each other. The network address can be referred to as a URL address. Communication can be provided over a communications medium, e.g., client(s) and server(s) may be coupled to one another via TCP/IP connection(s) for high-capacity communication.

Returning again to FIG. 1, in an embodiment, account owner 110 may wish to deposit a check that is drawn from account 170 at financial institution 150. Account owner 110 may deposit the check into account 160 by converting the check into electronic data and sending the data to financial institution 130. Aspects of the invention may thus comprise systems and methods carried out by the account owner 110 and his computer 111. Aspects of the invention may also comprise systems and methods carried out by the financial institution 130 and their server 131 or other electronics that facilitate and enable such deposit by the account owner 110.

For example, account owner 110 may convert the check into a digital image by scanning the front and/or back of the check using image capture device 112. Account owner 110 may then send the image to financial institution 130 using the systems and methods described herein. Please refer to FIG. 5 and corresponding description for a detailed exemplary embodiment of systems and methods for facilitating and processing a check deposit transaction. Upon receipt of the image, financial institution 130 may credit the funds to account 160. Financial institution 130 may clear the check by presenting the digital image to an intermediary bank,

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such as a regional branch of the Federal Reserve, a correspondent bank and/or a clearinghouse bank.

For example, the check may be cleared by presenting the digital image to financial institution 140, which may be a regional branch of the Federal Reserve, along with a request for payment. Financial institution 130 and 150 may have accounts at the regional branch of the Federal Reserve. As will be discussed in greater detail below, financial institution 130 may create a substitute check using the image provided by account owner 110 and present the substitute check to financial institution 140 for further processing. Upon receiving the substitute check, financial institution 140 may identify financial institution 150 as the paying bank (e.g., the bank from which the check is drawn). This may be accomplished using a nine-digit routing number located on the bottom left hand corner of the check. A unique routing number is typically assigned to every financial institution in the United States. Financial institution 140 may present the substitute check to financial institution 150 and request that the check be paid. If financial institution 150 verifies the check (i.e., agrees to honor the check), financial institution 140 may then settle the check by debiting funds from financial institution 150 and crediting funds to financial institution 130. Financial institution 150 may then debit funds from account 170.

It will be appreciated that the preceding examples are for purposes of illustration and explanation only, and that an embodiment is not limited to such examples. For example, financial institution 150 may be a correspondent bank (i.e., engaged in a partnership with financial institution 130). Thus, financial institution 130 may bypass the regional branch of the Federal Reserve and clear the check directly with financial institution 150. In addition, account 160 and account 170 may both be held at financial institution 130, in which case the check may be cleared internally.

FIG. 5 illustrates a system for facilitating deposit of a check, in which financial institution electronics 500 communicate with a computer 530 via network 520. There are a variety of unique aspects which may be described with reference to FIG. 5. We begin with a description of operations that may be carried out by the financial institution electronics 500, which will be referred to for the sake of simplicity as “server 500” with the understanding that additional electronics may be involved.

Server 500 may comprise a subsystem 511 for providing a software component 532 to a computer 530. This subcomponent may require the customer to download a virtual machine framework 533 so that the component 532 is operable on the operating system 535 and hardware 537 of the computer 530. In general, the software component allows the financial institution to control certain aspects of check image creation and delivery by the computer 530. Thus, while the computer 530 may be customer-controlled, the customer downloads component 532 to facilitate a deposit, thereby allowing a financial institution to effectively control certain aspects of the image generation and delivery process.

Server 500 may also comprise a subsystem for user authentication 512, such as by requiring a username and password. Other authentication methods such as requiring a digital certificate, data representing a customer fingerprint, and so forth are also possible. User authentication can open an interactive session supported by a component such as 508, in which the user can exchange information with the server 500 and receive instructions from the server 500. In addition, server 500 may, in some embodiments, control operation of the software component 532.

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Server **500** may comprise a subsystem for receiving from a customer-controlled general purpose computer such as **530**, an identification of an account for deposit of a check, and an amount of said check. "Remote deposit servlet" **510** may for example provide such functions. Remote deposit servlet **510** may provide a user interface (or user interface data) to a browser **534**, and such user interface may prompt a customer to enter information such as an account number and an amount of a check for deposit. In an embodiment where multiple checks are being deposited at once, the customer may itemize the checks by writing an amount of each. It will be appreciated that servlet **510** need not directly take responsibility for a website, and may instead merely communicate with one or more other subsystems that are responsible for doing so.

Server **500** may further comprise a subsystem for receiving from computer **530** an image of a front side of said check. "Image servlet" **509** is such a subsystem in the illustrated embodiment. In embodiments where software component **532** is responsible for delivering images to image servlet **509**, servlet **509** may be configured to communicate with component **532** as appropriate. In one embodiment, both an image of a front side of a check and an image of a back side of a check are received. These may be two separate images, or may be a single image in which the separately generated images are "stitched together" for simultaneous viewing as a single image.

Server **500** may further comprise a subsystem for analyzing said image of a front side of said check to determine if it meets at least one criterion. Subsystems **502** and **503** may for example perform such determining. In order to automate remote check deposits, it is desirable to configure server **500** to recognize that the image it receives is in fact a check, that the check is valid and not a duplicate, and that the received image can be used to further process the transaction. Image quality determination **502** may thus be provided to ensure that the received image can be used to further process the transaction.

Image usability determination subsystem **503** may further require an image to meet additional criteria. For example, it may be required that the image is in a particular format, e.g. a Joint Photographic Experts Group (JPEG) format. While systems may be designed to handle checks in any format, it may be cost effective to require customers to send in only images of specified formats so as to lower development costs of the system. It may also be required that the image is of a predetermined size, or that the image has features indicating it is a negotiable instrument of a desired type. For example, almost all checks have certain features, such as a MICR line, a signature line, an endorsement area on the back, an amount box, a date, and so forth. Often such features are in a consistent location on the check. A subsystem such as **503** may ensure that such features are present prior to allowing the transaction to continue.

Server **500** may further comprise a subsystem for performing Optical Character Recognition (OCR) on said image of said front side of said check. OCR can be useful in determining MICR line information such as routing number, account number, and check number. It can also be used to determine a check amount by performing OCR on the amount location of the check. Other information such as check date, payor name, payor financial institution, and so forth may be gleaned. Such information may be validated, for example, by comparing it to information such as a list of valid routing numbers, comparing an OCR-determined amount to a customer-entered amount, and so forth, or simply stored in a log file.

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Server **500** may further comprise a subsystem for determining if there is an error in said deposit of said check. Error processing **506** may be responsible for this, and may comprise a variety of useful aspects. In one embodiment, error processing **506** may comprise a subsystem for validating a routing number associated with said check. In another embodiment, error processing **506** may comprise a subsystem for determining if said check was previously deposited. For example, if a list of deposited checks is maintained for the depositing customer, then the check number can be compared against such a list. Comparing to a list of all deposits for an entire financial institution, or even multiple financial institutions, is also possible. However, if duplicate checking is to be done in real time, i.e. while the customer waits for confirmation, then it is desirable to streamline the process for example by only determining duplicates from a predetermined set of most likely relevant data.

Error processing **506** may further comprise a subsystem for comparing an amount of a check as provided by a customer to an amount determined by performing OCR on said image of said front side of said check. If the numbers do not match, the server can indicate an error and as a result, not proceed with the deposit transaction. Similarly, such an error may result from any error checking operation performed herein. Alternatively, certain errors can be designated as not meriting aborting a deposit, and may simply result in flagging the transaction for later scrutiny. Such a "transaction flagging" approach is particularly applicable to situations in which a duplicate check deposit is identified. Because duplicate determinations are prone to false positives, simply flagging, rather than aborting, a transaction may be preferable when a duplicate is possible.

OCR may also be applied to an image of a back side of the check. For example, in one embodiment, an OCR analysis of a MICR line location on an alleged image of a back of a check can be made. Backs of checks should not have MICR lines. Therefore, if such OCR process identifies MICR information, it can be determined that the image of the back of a check is improper. Thus, one criterion in analyzing an image of a back of a check may be the absence of a MICR line.

Server **500** may further comprise an endorsement determination subsystem **505**. Such a subsystem **505** may determine if a signature appears on said back side of said check. While endorsement of a check is not legally required for depositing a check into the payee's bank account, there are a variety of reasons banks typically require endorsement by the payee. Endorsement determination **505** may comprise simply checking for some indication of handwriting in the endorsement area of the image of the back side of a check. Other embodiments may go further by attempting to recognize an authorized signature of the payee and/or customer.

Server **500** may further comprise temporary image storage **501** for storing images while performing operations such as OCR and error processing. Images stored in temporary storage may be in the original format, i.e. as received from computer **530**, or in some other format, such as the bi-tonal TIFF format required by Check **21** legislation, or both. In fact, it can be useful to include in some embodiments a mechanism for converting images from such first format to a second format such as bi-tonal TIFF, and to place such images in a log file.

Server **500** may further comprise a subsystem for initiating a deposit of a check into the specified account **513**. Deposit initiation may comprise a wide variety of possible actions, depending on how such operations are initiated in particular bank systems. For example, a deposit might be

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initiated by “soft posting” or provisionally posting a credit to the customer’s account. It might be initiated by forwarding an image to the payor’s bank or Federal Reserve. It might be initiated by placing data in a batch file for processing all the deposits for the day. Deposit initiation is any action that sets in motion a chain of automated events resulting in a crediting of the customer’s account.

Referring now to computer 530, a number of novel aspects also pertain to computer 530 as well as the interaction between the computer 530 and the server 500. As described above, a software component 532 may be executed by computer 530 in connection with carrying out the invention. One embodiment of the software component is illustrated in FIG. 6. As illustrated in FIGS. 5 and 6, an exemplary component 532 may execute in conjunction with a virtual machine framework 533 as described above. This gives the advantage of developing a single component that works predictably on most customer computers, which may be configured somewhat differently, for example having different hardware 537 and operating systems 535.

A customer may connect to server 500 using a browser application 543 that executes on the computer 530. The customer may view instructions in the browser, for example instructing the customer to log in, instructing the customer to place a check on or in front of an image capture device, instructing the customer to edit an image, and so forth. The browser may run in conjunction with the software component 532, or the software component may run in a separate process and have its own user interface.

Image capture device control software and/or image edit software 531 may also execute on the computer 530. This software 531 interfaces with the image capture device 540, and may serve functions such as initiating image capture, managing image retrieval, facilitating image editing, and so forth. In one embodiment, software 531 may provide an interface so that it can be controlled to some extent by software component 532. If software component is in turn controlled by image servlet 509, the management of the image capture and retrieval process can be performed from the server 500. Alternatively, at any step along the way, the customer can be instructed to perform certain functions using software 531 or component 432, if such functions are better performed, or more conveniently performed by a human.

Storage location 536 provides a location that can be temporarily used by the component 532 to store images and/or a log file that may be generated to persist useful data regarding a deposit transaction.

Operations that are performed by the system comprising computer 530, browser 534, component 532, image capture software 531, image capture device 540, and customer (not shown) can generally comprise providing customer credentials, identifying an account, identifying an amount of a deposit, capturing an image of a front side of a check according to the criteria required by the bank via component 532, cropping and rotating the image of a front side of a check according to the criteria required by the bank via component 532, endorsing and capturing an image of a back side of a check according to the criteria required by the bank via component 532, and delivering such images to server 500.

FIG. 6 illustrates a system for facilitating deposit of a check from a customer-controlled general purpose computer, with special focus on aspects of the software component 600. As illustrated, an exemplary software component 600 may comprise a variety of functional subsystems 601-609. The component may in one-embodiment be server-

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activated in that it executes various aspects of its functionality after receiving instructions to do so from a server 640. As such, component 600 may have a server interface 601 for receiving commands from the server 640.

As mentioned above, the component 600 may also be designed to interoperate with a virtual machine framework 620, for the purpose of realizing certain benefits as understood in the art to accompany such technologies, such as facilitating widespread distribution and better guarantees of acceptable operation. The framework 620 in turn operates on the platform of the customer’s general purpose computer 630.

For example, the component 600 may provide a subsystem 602 for instructing a customer, for example via a user interface visible on a display coupled to a customer-controlled general purpose computer 630, in utilizing an image capture device to generate an electronic image of a front side of a check, such that said electronic image of a front side of a check meets at least one first criterion. In one embodiment, the customer may be instructed for example to place the check face-down in a top left corner of a scanner bed. The customer may further be instructed to place the check in a certain orientation. An image thus produced will meet criteria such as being upright and at a “right angle” with respect to a rectangular image format.

The component 600 may also comprise a subsystem 604 such as image capture device interface for receiving an image of a front side of a check from the image capture device. The image may be immediately uploaded to the server 640, or may be temporarily persisted using image storage function 605. A reason for such temporary persisting is to allow for certain customer modifications, and to allow for generation of further images such as an image of a back side of the check. Although not necessary to the invention, it can be expedient to deliver all images to the server 640 at once.

Once an image is generated, subsystem 602 may further instruct the customer to process the electronic image of a front side of a check. Processing the image may comprise simply approving the image if said image of a front side of a check meets said at least one first criterion. This aspect may also be provided by another subsystem such as 606. For example, the image may be presented to the customer and the customer may be asked if the image is right side up and legible. If so, the customer may approve the image, for example by selecting an appropriate approval button in the user interface.

Components 602, 604, 605, and 606 may operate similarly with regard to capturing an image of a back side of a check. The customer may be instructed by 602 to capture an electronic image of a back side of a check meets at least one third criterion, which may in one embodiment be a same criterion as the first criterion, e.g. image size, image legibility, image orientation, and so forth. The image may be received by the component via 604. The customer may also be asked to approve by 602.

Further to being instructed by 602 and/or 606 to process an image, a customer may be instructed to modify said electronic image of a front side of a check and I or a back side of the check, such that said electronic image of a front side of a check meets at least one second criterion. For example, an image as scanned may be presented to the customer, and the customer may be asked to select a bottom right corner of the check in the image. Assuming the top left corner of the check is also in the top left corner of the image, the customer selection of the bottom right corner of the



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check can be used to crop out any and all of the image that goes beyond the boundaries of the check.

Component 600 may also comprise a subsystem for generating a log file 607 comprising data associated with said deposit. Exemplary data that may be collected in the log file is an identification of the operating system used by the customer's general purpose computer, an identification of a browser used by the customer's general purpose computer, an identification of an image capture device make and model, an identification of a version of the JAVA virtual machine software, or, if .NET technologies are used, the version of the .NET Framework, and an identification of transaction data, for example a transaction ID, account number, customer name, amount of deposit, check routing number, check number, check account number, and so forth.

Component 600 may also comprise a subsystem for data delivery 608 and cleanup 609. The delivery subsystem 608 may initiate a delivery of images and other data, such as the log file, to the server. It may utilize functionality provided in the server interface 601 if desirable. The cleanup subsystem 609 may delete certain data from the customer's computer 630. For example, any image files that may have been created for temporary purposes may be deleted. Thus cleanup subsystem 609 may remove an electronic image of a front side of a check from a memory associated with said customer-controlled general purpose computer 630.

It should be appreciated that the various illustrations and examples provided herein also disclose corresponding methods and computer readable media bearing instructions for carrying out such methods. Furthermore, in addition to the specific implementations explicitly set forth herein, other aspects and implementations will be apparent to those skilled in the art from consideration of the specification disclosed herein. It is intended that the specification and illustrated implementations be considered as examples only, with a true scope and spirit of the following claims.

What is claimed is:

1. A method of facilitating remotely depositing funds into a user's account with a bank's computing system and without using an Automatic Teller Machine (ATM), comprising:

providing a remote deposit application for download to a customer device, wherein the remote deposit application comprises computer-executable instructions that, when executed by a processor, provide a user-interface and control a camera associated with the customer device to facilitate capturing at least one electronic image of a check;

receiving at the bank's computing system, via the user-interface on the customer device: authentication data, an electronic identification of an account for receipt of a value associated with the check, an electronic indication of the value associated with the check, and the at least one electronic image of the check;

determining whether the check was previously deposited using the at least one electronic image of the check; and initiating and/or logging a first deposit of the value to the account via the bank's computing system unless the bank's computing system determines from the at least one electronic image of the check that the check was previously deposited.

2. The method of claim 1, comprising passing error processing before initiating and/or logging the deposit of the value to the account.

3. The method of claim 2, comprising conducting optical character recognition on the at least one electronic image of

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the check and comparing results of the optical character recognition with validation data as part of the error processing.

4. The method of claim 1, comprising analyzing the at least one electronic image of the check and confirming that the at least one electronic image of the check meets at least one image criterion before initiating and/or logging the deposit of the value to the account.

5. The method of claim 4, wherein confirming that the at least one electronic image of the check meets at least one image criterion comprises confirming detection of image data corresponding to an endorsement.

6. The method of claim 4, wherein analyzing the at least one electronic image of the check comprises analyzing the at least one electronic image of the check with the bank's computing system to confirm the at least one electronic image of the check is legible, is appropriately sized, has an appropriate orientation, has an appropriate format, includes a validating image feature, includes a properly located image feature, or a combination thereof.

7. The method of claim 4, wherein analyzing the at least one electronic image of the check comprises analyzing the at least one electronic image of the check with the customer device to confirm the at least one electronic image of the check is legible, is appropriately sized, has an appropriate orientation, has an appropriate format, includes a validating image feature, includes a properly located image feature, or a combination thereof.

8. The method of claim 1, wherein receiving the at least one electronic image of the check comprises receiving the electronic indication of the value as an embedded aspect of the at least one electronic image.

9. The method of claim 1, comprising converting the at least one electronic image of the check to a bi-tonal image format.

10. A method of facilitating remotely depositing funds into a user's account via Internet-based communication without using an Automatic Teller Machine (ATM), comprising:

coordinating with a remote deposit application on a customer-controlled device to facilitate a deposit procedure including capturing, via a camera associated with the customer-controlled device, at least one electronic image of a check;

validating authentication data provided via the customer-controlled device;

receiving into a bank's computing system, via the customer-controlled device and the Internet-based communication:

an electronic identification of an account for receipt of a value associated with the check and an electronic indication of the value associated with the check, and the at least one electronic image of the check;

determining whether the check was previously deposited using the at least one electronic image of the check; and after validating the authentication data, triggering a deposit of the value to the account via the bank's computing system unless the bank's computing system determines from the at least one electronic image of the check that the check was previously deposited.

11. The method of claim 10, comprising providing the remote deposit application for download to the customer-controlled device, wherein the remote deposit application comprises computer-executable instructions that, when executed by a processor, provide a user-interface and control the camera to facilitate capturing the at least one electronic image of the check.

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12. The method of claim 10, comprising receiving the electronic indication of the value based on optical recognition of image data in the at least one electronic image of the check.

13. The method of claim 10, comprising analyzing the at least one electronic image of the check with the customer-controlled device or the bank's computing system to confirm the at least one electronic image of the check is legible, is appropriately sized, has an appropriate orientation, has an appropriate format, includes a validating image feature, includes a properly located image feature, or a combination thereof before triggering the deposit.

14. The method of claim 10, comprising displaying a prompt via a user-interface of the customer-controlled device, wherein the prompt provides user instruction regarding initiating a check deposit.

15. A system for facilitating remote deposit of funds into a user's account via Internet-based communication without using an Automatic Teller Machine (ATM), comprising:

one or more processors;

communication circuitry configured to receive data from a user-owned device, wherein the data comprises electronic image data for a check; and

one or more tangible, non-transitory machine-readable media comprising processor-executable instructions, that when executed by the one or more processors cause the one or more processors to:

authenticate interaction with the user-owned device based on authentication data received from the user-owned device via the communication circuitry;

accept or determine amount data indicative of an amount of the check from the user-owned device via the communication circuitry;

accept or determine account data identifying an account for receipt of the amount of the check from the user-owned device via the communication circuitry;

accept at least one electronic image of the check from the user-owned device via the communication circuitry;

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determine whether the check was previously deposited using the at least one electronic image of the check; and

activate updating of the account to reflect a deposit of the amount into the account unless the bank's computing system determines from the at least one electronic image of the check that the check was previously deposited.

16. The system of claim 15, wherein the one or more tangible, non-transitory machine-readable media comprise processor-executable instructions to determine the amount data from the electronic image data using optical character recognition.

17. The system of claim 15, wherein the authentication data includes a digital certificate or data representing a fingerprint.

18. The system of claim 15, wherein the one or more tangible, non-transitory machine-readable media comprise processor-executable instructions to analyze and confirm that the at least one electronic image of the check meets at least one image criterion before proceeding to activate updating of the account.

19. The system of claim 18, wherein the one or more tangible, non-transitory machine-readable media comprise processor-executable instructions to confirm the at least one electronic image of the check is legible, is appropriately sized, has an appropriate orientation, has an appropriate format, includes a validating image feature, includes a properly located image feature properly, or a combination thereof before proceeding to activate updating of the account.

20. The system of claim 15, wherein the one or more tangible, non-transitory machine-readable media comprise processor-executable instructions to convert the at least one electronic image of the check to a bi-tonal image format.

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